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# LED LCD TV
# SERVICE MANUAL

**CHASSIS : LD23E**

## MODEL : 55LM960V 55LM960V-ZB

**CAUTION**
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

P/NO : MFL67361003 (1203-REV00)

Printed in Korea

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# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

### General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

**Before returning the receiver to the customer,**

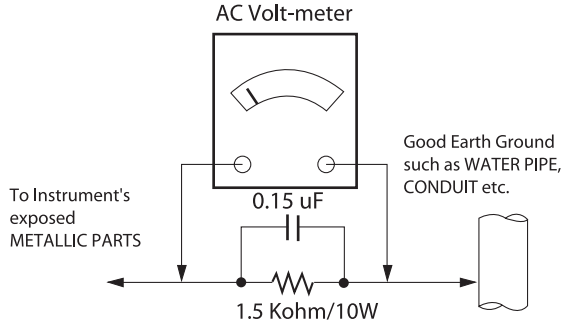
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

**Leakage Current Cold Check(Antenna Cold Check)**
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

**Leakage Current Hot Check** (See below Figure)
Plug the AC cord directly into the AC outlet.

**Do not use a line Isolation Transformer during this check.**
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

**Leakage Current Hot Check circuit**




When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

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# SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.
*NOTE*: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   **CAUTION**: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
   **CAUTION**: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   **CAUTION**: Do not connect the test fixture ground strap to any heat sink in this receiver.

**Electrostatically Sensitive (ES) Devices**

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor “chip” components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   **CAUTION**: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   **CAUTION**: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

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**IC Remove/Replacement**
Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

*Removal*
1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

*Replacement*
1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

**"Small-Signal" Discrete Transistor Removal/Replacement**
1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device
Removal/Replacement
1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement
1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor
Removal/Replacement
1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

**Circuit Board Foil Repair**
Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

*At IC Connections*
To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

*At Other Connections*
Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side.
   Carefully crimp and solder the connections.
   **CAUTION**: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

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# SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

## 1. Application range

This specification is applied to the LCD TV used LD23E chassis.

## 2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
2) Relative Humidity: 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 100-240 V~, 50/60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 20 minutes prior to the adjustment.

## 3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : CE, IEC specification
   - EMC : CE, IEC
   - Wireless : Wireless HD Specification (Option)

## 4. Model General Specification

| No. | Item | Specification | Remarks |
|---|---|---|---|
| 1 | Market | EU(PAL Market-36Countries) | **DTV & Analog (Total 37 countries)**<br>**DTV(MPEG2/4,DVB-T/T2/S)**<br>Albania/Austria/Belarus/Belgium/Bosnia/Bulgaria/Croatia/Czech/Estonia/France/Germany/Greece/Hungary/Ireland/Italy/Kazakhstan/Latvia/Lithuania/Luxembourg/Morocco/Netherlands/Poland/Portugal/Romania/Russia/Serbia/Slovenia/Spain/Slovakia/Switzerland/Turkey/UK/Ukraine/Denmark/Finland/Norway/Sweden<br><br>**Supported satellite : 29 satellites**<br>ABS1 75.0E/ AMOS 4.0W/ ASIASATS 105.5E/ ASTRA1L-HMKR 19.2E/ ASTRA2ABD 28.2E/ ASTRA3AB 23.5E/ ASTRA4A 4.8E/ ATLANTICBIRD2 8.0W/ ATLANTICBIRD3 5.0W/ BADR 26.0E/ EUROBIRD3 33.0E/ EUROBIRD9A 9.0E/ EUTELSATW2A 10.E/ EUTELSATW3A 7.0E/ EUTELSATW4W7 36.0E/ EUTELSESAT 16.0E/ EXPRESSAM1 40.0E/ EXPRESAM3 140.0E/ EXPRESSAM33 96.5E/ HELLASAT2 39.0E/ HISPASAT1CDE 30.0W/ HOTBIRD 13.0E/ INTELSAT10&7 68.5E/ INTELSAT15 85.2E/ INTELSAT904 60.0E/ NILESAT 7.0W/ THOR 0.8W/ TURKSAT 42.0E/ YAMAL201 90.0E |
| 2 | Broadcasting system | 1) PAL-BG<br>2) PAL-DK<br>3) PAL-I/I'<br>4) SECAM L/L', DK, BG, I<br>5) DVB-T<br>6) DVB-C<br>7) DVB-T2<br>8) DVB-S<br>9) DVB-S2 | DVB-S: Satellite |

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| No. | Item | Specification | Remarks |
|---|---|---|---|
| 3 | Receiving system | Analog : Upper Heterodyne<br>Digital : COFDM, QAM | ► DVB-T<br>- Guard Interval(Bitrate_Mbit/s)<br>1/4, 1/8, 1/16, 1/32<br>- Modulation : Code Rate<br>QPSK : 1/2, 2/3, 3/4, 5/6, 7/8<br>16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8<br>64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8<br><br>► DVB-T2<br>- Guard Interval(Bitrate_Mbit/s)<br>1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256,<br>- Modulation : Code Rate<br>QPSK : 1/2, 2/5, 2/3, 3/4, 5/6<br>16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br>64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br>256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br><br>► DVB-C<br>- Symbolrate :<br>4.0Msymbols/s to 7.2Msymbols/s<br>- Modulation :<br>16QAM, 64-QAM, 128-QAM and 256-QAM<br><br>► DVB-S/S2<br>- symbolrate<br>DVB-S2 (8PSK / QPSK) : 2 ~ 45Msymbol/s<br>DVB-S (QPSK) : 2 ~ 45Msymbol/s<br>- viterbi<br>DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8<br>DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10 |
| 4 | Input Voltage | AC 100 ~ 240V 50/60Hz | |
| 5 | Screen Size | 46.96 inches | 1046.68(H) x 594.02(V) x 1.5(D)mm (Typ.)<br>FHD+240Hz |
| 6 | Aspect Ratio | 16:9 | |
| 7 | Tuning System | | |
| 8 | Operating Environment | 1) Temp : 0 ~ 40 deg<br>2) Humidity : ~ 80 % | |
| 9 | Storage Environment | 1) Temp : -20 ~ 60 deg<br>2) Humidity : ~ 85 % | |

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## 5. Component Video Input (Y, CB/PB, CR/PR)

| No. | Resolution | H-freq(kHz) | V-freq(Hz) | Pixel clock |
|---|---|---|---|---|
| 1. | 720×480 | 15.73 | 60.00 | SDTV, DVD 480i |
| 2. | 720×480 | 15.63 | 59.94 | SDTV, DVD 480i |
| 3. | 720×480 | 31.47 | 59.94 | 480p |
| 4. | 720×480 | 31.50 | 60.00 | 480p |
| 5. | 720×576 | 15.625 | 50.00 | SDTV 576i |
| 6. | 720×576 | 31.25 | 50.00 | SDTV 576p |
| 7. | 1280×720 | 45.00 | 50.00 | HDTV 720p |
| 8. | 1280×720 | 44.96 | 59.94 | HDTV 720p |
| 9. | 1280×720 | 45.00 | 60.00 | HDTV 720p |
| 10. | 1920×1080 | 31.25 | 50.00 | HDTV 1080i |
| 11. | 1920×1080 | 33.75 | 60.00 | HDTV 1080i |
| 12. | 1920×1080 | 33.72 | 59.94 | HDTV 1080i |
| 13. | 1920×1080 | 56.250 | 50 | HDTV 1080p |
| 14. | 1920×1080 | 67.5 | 60 | HDTV 1080p |

## 6. RGB input (PC)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | Proposed | |
|---|---|---|---|---|---|---|
| | PC | | | | | DDC |
| 1 | 640*350 | 31.468 | 70.09 | 25.17 | EGA | X |
| 2 | 720*400 | 31.469 | 70.08 | 28.32 | DOS | O |
| 3 | 640*480 | 31.469 | 59.94 | 25.17 | VESA(VGA) | O |
| 4 | 800*600 | 37.879 | 60.31 | 40.00 | VESA(SVGA) | O |
| 5 | 1024*768 | 48.363 | 60.00 | 65.00 | VESA(XGA) | O |
| 6 | 1152*864 | 54.348 | 60.053 | 80 | VESA (WXGA) | X |
| 7 | 1360*768 | 47.712 | 60.015 | 85.5 | WUXGA | O |
| 8 | 1920*1080 | 67.5 | 60.00 | 148.5 | WUXGA(CEA861D) | O |

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# 7. HDMI Input

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | VIC | Proposed | |
|---|---|---|---|---|---|---|---|
| **HDMI-PC** | | | | | | | DDC |
| 1 | 720*400 | 31.468 | 70.08 | 28.321 | | | X |
| 2 | 640*480 | 31.469 | 59.94 | 25.17 | | VESA | O |
| 3 | 800*600 | 37.879 | 60.31 | 40.00 | | VESA | O |
| 4 | 1024*768 | 48.363 | 60.00 | 65.00 | | VESA(XGA) | O |
| 5 | 1360*768 | 47.72 | 59.8 | 84.75 | | WXGA | O |
| 6 | 1280*1024 | 63.595 | 60.0 | 108.875 | | SXGA | O |
| 7 | 1920*1080 | 67.5 | 60.00 | 148.5 | | WUXGA | O |
| 8 | 1360*768 | 47.712 | 60.015 | 85.5 | | VESA(WXGA) | O |
| 9 | 1920*1080 | 67.5 | 60.00 | 148.5 | | WUXGA(CEA861D) | O |
| **HDMI-DTV** | | | | | | | |
| 1 | 640*480 | 31.469 / 31.5 | 59.94/ 60 | 25.125 | 1 | SDTV 480P | |
| 2 | 720*480 | 31.469 / 31.5 | 59.94 / 60 | 27.00/27.03 | 2,3 | SDTV 480P | |
| 3 | 720*576 | 31.25 | 50 | 27 | 17,18 | SDTV 576P | |
| 4 | 720*576 | 15.625 | 50 | 27 | 21 | SDTV 576I | |
| 5 | 1280*720 | 37.500 | 50 | 74.25 | 19 | HDTV 720P | |
| 6 | 1280*720 | 44.96 / 45 | 59.94 / 60 | 74.17/74.25 | 4 | HDTV 720P | |
| 7 | 1920*1080 | 33.72 / 33.75 | 59.94 / 60 | 74.17/74.25 | 5 | HDTV 1080I | |
| 8 | 1920*1080 | 28.125 | 50.00 | 74.25 | 20 | HDTV 1080I | |
| 9 | 1920*1080 | 26.97 / 27 | 23.97 / 24 | 74.17/74.25 | 32 | HDTV 1080P | |
| 10 | 1920*1080 | | 25 | | 33 | HDTV 1080P | |
| 11 | 1920*1080 | 33.716 / 33.75 | 29.976 / 30.00 | 74.25 | 34 | HDTV 1080P | |
| 12 | 1920*1080 | 56.250 | 50 | 148.5 | 31 | HDTV 1080P | |
| 13 | 1920*1080 | 67.43 / 67.5 | 59.94 / 60 | 148.35/148.50 | 16 | HDTV 1080P | |

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# 8. 3D Mode

## 8.1. RF Input(3D supported mode manually)

| No. | Resolution | Proposed | 3D input proposed mode |
|---|---|---|---|
| 1 | HD | 1080I<br>720P | 2D to 3D<br>Side by Side(Half)<br>Top & Bottom |
| 2 | SD | 576P<br>576I | 2D to 3D |

## 8.2. RF Input(3D supported mode automatically)

| No. | Signal | 3D input proposed mode |
|---|---|---|
| 1 | Frame Compatible | Side by Side(Half),<br>Top & Bottom |

## 8.3. HDMI Input

### 8.3.1. HDMI 1.3 (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(kHz) | Pixel clock(MHz) | Proposed | 3D input proposed mode |
|---|---|---|---|---|---|---|
| 1 | 1280*720 | 45.00 | 60.00 | 74.25 | HDTV 720P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Single Frame Sequential |
| 2 | 1280*720 | 37.500 | 50 | 74.25 | HDTV 720P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Single Frame Sequential |
| 3 | 1920*1080 | 33.75 | 60.00 | 74.25 | HDTV 1080I | 2D to 3D<br>Side by Side(half),<br>Top & Bottom |
| 4 | 1920*1080 | 28.125 | 50.00 | 74.25 | HDTV 1080I | 2D to 3D<br>Side by Side(half),<br>Top & Bottom |
| 5 | 1920*1080 | 27.00 | 24.00 | 74.25 | HDTV 1080P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom |
| 6 | 1920*1080 | 28.12 | 25 | 74.25 | HDTV 1080P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Checkerboard |
| 7 | 1920*1080 | 33.75 | 30.00 | 74.25 | HDTV 1080P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Checkerboard |
| 8 | 1920*1080 | 56.25 | 50 | 148.5 | HDTV 1080P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Checkerboard,<br>Single Frame Sequential,<br>Row Interleaving,<br>Column Interleaving |
| 9 | 1920*1080 | 67.50 | 60.00 | 148.5 | HDTV 1080P | 2D to 3D<br>Side by Side(half),<br>Top & Bottom,<br>Checkerboard,<br>Single Frame Sequential,<br>Row Interleaving,<br>Column Interleaving |

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### 8.3.2. HDMI 1.4b (3D supported mode automatically)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | VIC | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|---|
| 1 | 640*480 | 31.469 / 31.5 | 59.94/ 60 | 25.125 | 1 | Top-and-Bottom<br>Side-by-side(half) | Secondary(SDTV 480P)<br>Secondary(SDTV 480P) |
| 2 | | 62.938/63 | 59.94/ 60 | 50.35/50.4 | 1 | Frame packing<br>Line alternative | Secondary(SDTV 480P)<br>(SDTV 480P) |
| 3 | | 31.469 / 31.5 | 59.94/ 60 | 50.35/50.4 | 1 | Side-by-side(Full) | (SDTV 480P) |
| 4 | 720*480 | 31.469 / 31.5 | 59.94 / 60 | 27.00/27.03 | 2,3 | Top-and-Bottom<br>Side-by-side(half) | Secondary(SDTV 480P)<br>Secondary(SDTV 480P) |
| 5 | | 62.938/63 | 59.94 / 60 | 54/54.06 | 2,3 | Frame packing<br>Line alternative | Secondary(SDTV 480P)<br>(SDTV 480P) |
| 6 | | 31.469 / 31.5 | 59.94 / 60 | 54/54.06 | 2,3 | Side-by-side(Full) | (SDTV 480P) |
| 7 | 720*576 | 31.25 | 50 | 27 | 17,18 | Top-and-Bottom<br>Side-by-side(half) | Secondary(SDTV 576P)<br>Secondary(SDTV 576P) |
| 8 | | 62.5 | 50 | 54 | 17,18 | Frame packing<br>Line alternative | Secondary(SDTV 576P)<br>(SDTV 576P) |
| 9 | | 31.25 | 50 | 54 | 17,18 | Side-by-side(Full) | (SDTV 576P) |
| 10 | 720*576 | 15.625 | 50 | 27 | 21 | Top-and-Bottom<br>Side-by-side(half) | Secondary(SDTV 576I)<br>Secondary(SDTV 576I) |
| 11 | | 31.25 | 50 | 54 | 21 | Frame packing<br>Field alternative | Secondary(SDTV 576I)<br>(SDTV 576I) |
| 12 | | 15.625 | 50 | 54 | 21 | Side-by-side(Full) | (SDTV 576I) |
| 13 | 1280*720 | 37.500 | 50 | 74.25 | 19 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 720P)<br>Primary(HDTV 720P) |
| 14 | | 75 | 50 | 148.5 | 19 | Frame packing<br>Line alternative | Primary(HDTV 720P)<br>(HDTV 720P) |
| 15 | | 37.500 | 50 | 148.5 | 19 | Side-by-side(Full) | (HDTV 720P) |
| 16 | | 44.96 / 45 | 59.94 / 60 | 74.18/74.25 | 4 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 720P)<br>Primary(HDTV 720P) |
| 17 | | 89.91/90 | 59.94 / 60 | 148.35/148.5 | 4 | Frame packing<br>Line alternative | Primary(HDTV 720P)<br>(HDTV 720P) |
| 18 | | 44.96 / 45 | 59.94 / 60 | 148.35/148.5 | 4 | Side-by-side(Full) | (HDTV 720P) |
| 19 | 1920*1080 | 33.72 / 33.75 | 59.94 / 60 | 74.17/74.25 | 5 | Top-and-Bottom<br>Side-by-side(half) | Secondary(HDTV 1080I)<br>Primary(HDTV 1080I) |
| 20 | | 67.432/67.50 | 59.94 / 60 | 148.35/148.5 | 5 | Frame packing<br>Field alternative | Primary(HDTV 1080I)<br>(HDTV 1080I) |
| 21 | | 33.72 / 33.75 | 59.94 / 60 | 148.35/148.5 | 5 | Side-by-side(Full) | (HDTV 1080I) |
| 22 | | 28.125 | 50.00 | 74.25 | 20 | Top-and-Bottom<br>Side-by-side(half) | Secondary(HDTV 1080I)<br>Primary(HDTV 1080I) |
| 23 | | 56.25 | 50.00 | 148.5 | 20 | Frame packing<br>Field alternative | Primary(HDTV 1080I)<br>(HDTV 1080I) |
| 24 | | 28.125 | 50.00 | 74.25 | 20 | Side-by-side(Full) | (HDTV 1080I) |
| 25 | 1920*1080 | 26.97 / 27 | 23.97 / 24 | 74.18/74.25 | 32 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 1080P)<br>Primary(HDTV 1080P) |
| 26 | | 43.94/54 | 23.97 / 24 | 148.35/148.5 | 32 | Frame packing<br>Line alternative | Primary(HDTV 1080P)<br>(HDTV 1080P) |
| 27 | | 26.97 / 27 | 23.97 / 24 | 148.35/148.5 | 32 | Side-by-side(Full) | (HDTV 1080P) |
| 28 | | 28.12 | 25 | 74.25 | 33 | Top-and-Bottom<br>Side-by-side(half) | Secondary(HDTV 1080P)<br>Secondary(HDTV 1080P) |
| 29 | | 56.24 | 25 | 148.5 | 33 | Frame packing<br>Line alternative | Secondary(HDTV 1080P)<br>(HDTV 1080P) |
| 30 | | 28.12 | 25 | 148.5 | 33 | Side-by-side(Full) | (HDTV 1080P) |
| 31 | | 33.716 / 33.75 | 29.976 / 30.00 | 74.18/74.25 | 34 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 1080P)<br>Secondary(HDTV 1080P) |
| 32 | | 67.432 / 67.5 | 29.976 / 30.00 | 148.35/148.5 | 34 | Frame packing<br>Line alternative | Primary(HDTV 1080P)<br>(HDTV 1080P) |
| 33 | | 33.716 / 33.75 | 29.976 / 30.00 | 148.35/148.5 | 34 | Side-by-side(Full) | (HDTV 1080P) |
| 34 | | 56.250 | 50 | 148.5 | 31 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 1080P)<br>Secondary(HDTV 1080P) |
| 35 | | 67.43 / 67.5 | 59.94 / 60 | 148.35/148.50 | 16 | Top-and-Bottom<br>Side-by-side(half) | Primary(HDTV 1080P)<br>Secondary(HDTV 1080P) |

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## 8.4. HDMI-PC Input (3D) (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1024*768 | 48.36 | 60 | 65 | 2D to 3D, Side by Side(half)<br>Top & Bottom | HDTV 768P |
| 2 | 1360*768 | 47.71 | 60 | 85.5 | 2D to 3D, Side by Side(half)<br>Top & Bottom | HDTV 768P |
| 3 | 1920*1080 | 67.500 | 60 | 148.50 | 2D to 3D, Side by Side(half)<br>Top & Bottom, Checker Board,<br>Single Frame Sequential,<br>Row Interleaving,<br>Column Interleaving | HDTV 1080P |
| 4 | Others | - | - | - | 2D to 3D | 640*350<br>720*400<br>640*480<br>800*600<br>1152*864 |

## 8.5. RGB-PC Input (3D) (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1024*768 | 48.36 | 60 | 65 | 2D to 3D, Side by Side(half)<br>Top & Bottom | HDTV 768P |
| 2 | 1360*768 | 47.71 | 60 | 85.5 | 2D to 3D, Side by Side(half)<br>Top & Bottom | HDTV 768P |
| 3 | 1920*1080 | 67.500 | 60 | 148.50 | 2D to 3D, Side by Side(half)<br>Top & Bottom, | HDTV 1080P |
| 4 | Others | - | - | - | 2D to 3D | 640*350<br>720*400<br>640*480<br>800*600<br>1152*864<br>1280*1024 |

## 8.6. Component Input(3D) (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1280*720 | 37.5 | 50 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 720P |
| 2 | 1280*720 | 45.00 | 60.00 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 720P |
| 3 | 1280*720 | 44.96 | 59.94 | 74.176 | 2D to 3D, Side by Side, Top & Bottom | HDTV 720P |
| 4 | 1920*1080 | 33.75 | 60.00 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080I |
| 5 | 1920*1080 | 33.72 | 59.94 | 74.176 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080I |
| 6 | 1920*1080 | 28.12 | 50 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080I |
| 7 | 1920*1080 | 67.500 | 60 | 148.50 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 8 | 1920*1080 | 67.432 | 59.94 | 148.352 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 9 | 1920*1080 | 27.000 | 24.000 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 10 | 1920*1080 | 28.12 | 25 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 11 | 1920*1080 | 56.25 | 50 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 12 | 1920*1080 | 26.97 | 23.976 | 74.176 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 13 | 1920*1080 | 33.75 | 30.000 | 74.25 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |
| 14 | 1920*1080 | 33.71 | 29.97 | 74.176 | 2D to 3D, Side by Side, Top & Bottom | HDTV 1080P |

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## 8.7. USB Input(3D) (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1920*1080 | 33.75 | 30 | 74.25 | 2D to 3D, Side by Side(Half),<br>Top & Bottom, Checkerboard,<br>Row Interleaving, Column Interleaving<br>(Photo : side by Side(half), Top & Bottom) | HDTV 1080P |

## 8.8. USB Input(3D) (3D supported mode automatically)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1920*1080 | 33.75 | 30 | 74.25 | Side by Side(Half), Top & Bottom,<br>Checkerboard, MPO(photo) | HDTV 1080P |

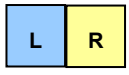
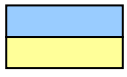
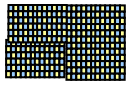
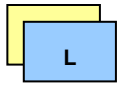
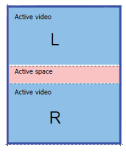
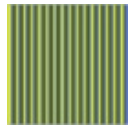
## 8.9. DLNA Input (3D) (3D supported mode manually)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1920*1080 | 33.75 | 30 | 74.25 | 2D to 3D, Side by Side(Half),<br>Top & Bottom, Checkerboard,<br>Row Interleaving, Column Interleaving<br>(Photo : side by Side(half), Top & Bottom) | HDTV 1080P |

## 8.10. DLNA Input (3D) (3D supported mode automatically)

| No. | Resolution | H-freq(kHz) | V-freq.(Hz) | Pixel clock(MHz) | 3D input proposed mode | Proposed |
|---|---|---|---|---|---|---|
| 1 | 1920*1080 | 33.75 | 30 | 74.25 | Side by Side(Half), Top & Bottom,<br>Checkerboard, MPO(photo) | HDTV 1080P |

■ Remark: 3D Input mode

| No. | Side by Side | Top & Bottom | Checker board | Single Frame Sequential | Frame Packing | Line Interleaving | Column Interleaving |
|---|---|---|---|---|---|---|---|
| 1 |  |  |  |  |  | |  |

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# ADJUSTMENT INSTRUCTION

## 1. Application Range

This specification sheet is applied to all of the LED LCD TV with LD23E chassis.

## 2. Designation

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
(2) Adjustment must be done in the correct order.
(3) The adjustment must be performed in the circumstance of 25 °C ± 5 °C of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0 °C, it should be placed in the circumstance of above 15 °C for 2 hours.

In case of keeping module is in the circumstance of below -20 °C, it should be placed in the circumstance of above 15 °C for 3 hours.

[Caution]
When still image is displayed for a period of 20 minutes or longer (Especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

## 3. Automatic Adjustment

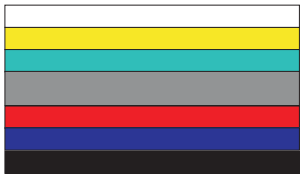
### 3.1. ADC Adjustment

#### 3.1.1. Overview

ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

#### 3.1.2. Equipment & Condition

(1) USB to RS-232C Jig
(2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern - 65)
- Resolution : 480i Comp1
  1080P Comp1
  1920*1080 RGB
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level : 0.7 ± 0.1 Vp-p
- Image



#### 3.1.3. Adjustment

(1) Adjustment method
- Using RS-232, adjust items in the other shown in "3.1.3.3)"

(2) Adj. protocol

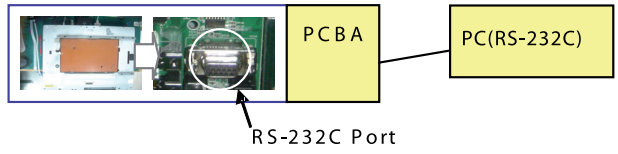
| Protocol | Command | Set ACK |
|---|---|---|
| Enter adj. mode | aa 00 00 | a 00 OK00x |
| Source change | xb 00 04<br>xb 00 06 | b 00 OK04x (Adjust 480i, 1080p Comp1 )<br>b 00 OK06x (Adjust 1920*1080 RGB) |
| Begin adj. | ad 00 10 | |
| Return adj. result | | OKx (Case of Success)<br>NGx (Case of Fail) |
| Read adj. data | (main)<br>ad 00 20 | (main)<br>00000000000000000000000007c007b006dx |
| | (sub )<br>ad 00 21 | (Sub)<br>00000007000000000000000007c00830077x |
| Confirm adj. | ad 00 99 | NG 03 00x (Fail)<br>NG 03 01x (Fail)<br>NG 03 02x (Fail)<br>OK 03 03x (Success) |
| End adj. | aa 00 90 | a 00 OK90x |

Ref.) ADC Adj. RS232C Protocol_Ver1.0

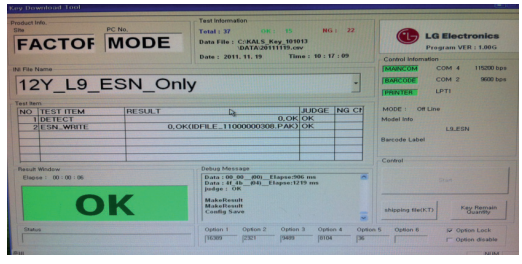
(3) Adj. order
- aa 00 00 [Enter ADC adj. mode]
- xb 00 04 [Change input source to Component1 (480i& 1080p)]
- ad 00 10 [Adjust 480i&1080p Comp1]
- xb 00 06 [Change input source to RGB(1024*768)]
- ad 00 10 [Adjust 1920*1080 RGB]
- ad 00 90 End adj.

### 3.2. MAC address D/L, CI+ key D/L, Widevine key D/L

Connect: PCBA Jig → RS-232C Port== PC → RS-232C Port
Communication Prot connection




▪ Com 1,2,3,4 and 115200(Baudrate)
Mode check: Online Only
▪ Check the test process: DETECT → MAC → CI → Widevine → ESN
▪ Play: START
▪ Result: Ready, Test, OK or NG
▪ Printer Out (MAC Address Label)

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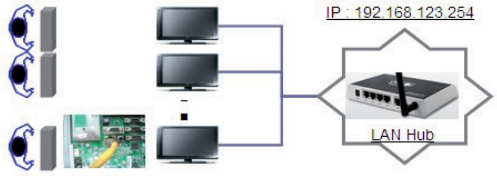
## 3.3. LAN Inspection

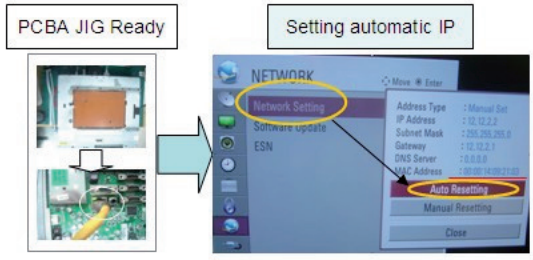
### 3.3.1. Equipment & Condition

▪ Each other connection to LAN Port of IP Hub and Jig



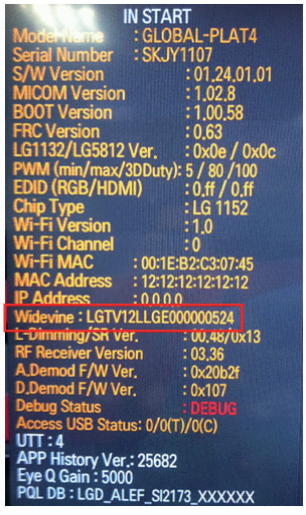

### 3.3.2. LAN inspection solution

▪ LAN Port connection with PCB
▪ Network setting at MENU Mode of TV
▪ Setting automatic IP
▪ Setting state confirmation
→ If automatic setting is finished, you confirm IP and MAC Address.




### 3.3.3. WIDEVINE key Inspection

- Confirm key input data at the "IN START" MENU Mode.


IN START
Model Name : GLOBAL-PLAT4
Serial Number : SKJY1107
S/W Version : 01.24.01.01
MICOM Version : 1.02.8
BOOT Version : 1.00.58
FRC Version : 0.63
LG1132/LG5812 Ver. : 0x0e / 0x0c
PWM (min/max/3DDuty): 5 / 80 /100
EDID (RGB/HDMI) : 0.ff / 0.ff
Chip Type : LG 1152
Wi-Fi Version : 1.0
Wi-Fi Channel : 0
Wi-Fi MAC : 00:1E:B2:C3:07:45
MAC Address : 12:12:12:12:12:12
IP Address : 0.0.0.0
Widevine : LGTV12LLGE000000524
L-Dimming/SR Ver. : 00.48/0x13
RF Receiver Version : 03.36
A.Demod F/W Ver. : 0x20b2f
D.Demod F/W Ver. : 0x107
Debug Status : DEBUG
Access USB Status: 0/0(T)/0(C)
UTT : 4
APP History Ver.: 25682
Eye Q Gain : 5000
PQL DB : LGD_ALEF_SI2173_XXXXXX

## 3.4. LAN PORT INSPECTION(PING TEST)

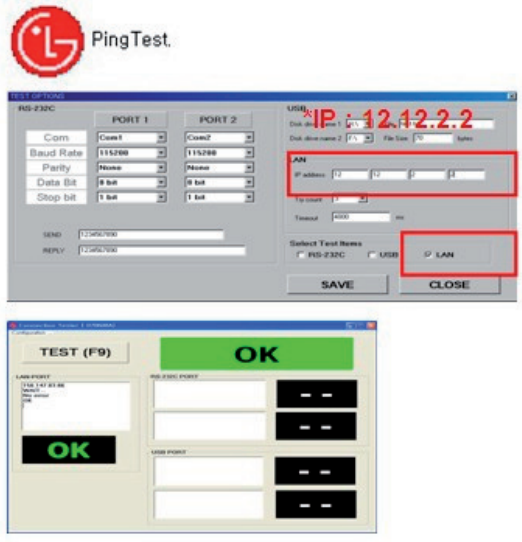
Connect SET → LAN port == PC → LAN Port

### 3.4.1. Equipment setting

(1) Play the LAN Port Test PROGRAM.
(2) Input IP set up for an inspection to Test Program.
*IP Number : 12.12.2.2

### 3.4.2. LAN PORT inspection(PING TEST)

(1) Play the LAN Port Test Program.
(2) Connect each other LAN Port Jack.
(3) Play Test (F9) button and confirm OK Message.
(4) Remove LAN cable.




## 3.5. Model name & Serial number Download

### 3.5.1. Model name & Serial number D/L

▪ Press "Power on" key of service remote control.
(Baud rate : 115200 bps)
▪ Connect RS232 Signal Cable to RS-232 Jack.
▪ Write Serial number by use RS-232.
▪ Must check the serial number at Instart menu.

### 3.5.2. Method & notice

(1) Serial number D/L is using of scan equipment.
(2) Setting of scan equipment operated by Manufacturing Technology Group.
(3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

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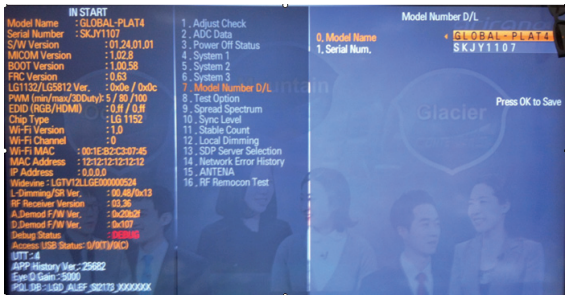
* Manual Download (Model Name and Serial Number)
If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)
It is impossible to download by bar code scan, so It need Manual download.

1) Press the "Instart" key of Adjustment remote control.
2) Go to the menu "7.Model Number D/L" like below photo.
3) Input the Factory model name(ex 42LD450-TA) or Serial number like photo.




4) Check the model name Instart menu. → Factory name displayed. (ex 47LM960V-ZB)
5) Check the Diagnostics.(DTV country only) → Buyer model displayed. (ex 47LM960V-ZB)

## 3.6. CI+ Key checking method

- Check the Section 4.2

Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).

=> Check the Download to CI+ Key value in LGset.

### 3.6.1. Check the method of CI+ Key value

(1) Check the method on Instart menu
(2) Check the method of RS232C Command
1) Into the main ass'y mode(RS232: aa 00 00)

| CMD 1 | CMD 2 | Data 0 | |
|---|---|---|---|
| A | A | 0 | 0 |

2) Check the key download for transmitted command (RS232: ci 00 10)

| CMD 1 | CMD 2 | Data 0 | |
|---|---|---|---|
| C | I | 1 | 0 |

3) Result value
- Normally status for download : OKx
- Abnormally status for download : NGx

### 3.6.2. Check the method of CI+ key value(RS232)

1) Into the main ass'y mode(RS232: aa 00 00)

| CMD 1 | CMD 2 | Data 0 | |
|---|---|---|---|
| A | A | 0 | 0 |

2) Check the mothed of CI+ key by command (RS232: ci 00 20)

| CMD 1 | CMD 2 | Data 0 | |
|---|---|---|---|
| C | I | 2 | 0 |

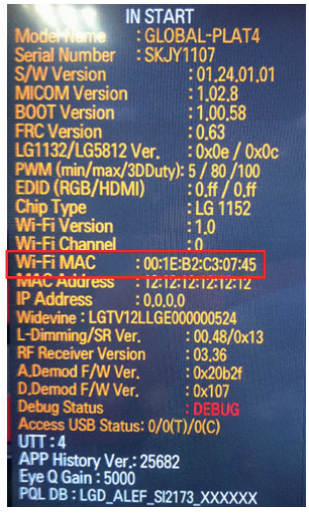
3) Result value
i 01 OK 1d1852d21c1ed5dcx
CI+ Key Value

## 3.7. WIFI MAC ADDRESS CHECK

**(1) Using RS232 Command**

| | H-freq(kHz) | V-freq.(Hz) |
|---|---|---|
| Transmission | [A][I][][Set ID][][20][Cr] | [O][K][X] or [NG] |

**(2) Check the menu on in-start**


IN START
Model Name : GLOBAL-PLAT4
Serial Number : SKJY1107
S/W Version : 01.24.01.01
MICOM Version : 1.02.8
BOOT Version : 1.00.58
FRC Version : 0.63
LG1132/LG5812 Ver. : 0x0e / 0x0c
PWM (min/max/3DDuty): 5 / 80 /100
EDID (RGB/HDMI) : 0.ff / 0.ff
Chip Type : LG 1152
Wi-Fi Version : 1.0
Wi-Fi Channel : 0
Wi-Fi MAC : 00:1E:B2:C3:07:45
MAC Address : 12:12:12:12:12:12
IP Address : 0.0.0.0
Widevine : LGTV12LLGE000000524
L-Dimming/SR Ver. : 00.48/0x13
RF Receiver Version : 03.36
A.Demod F/W Ver. : 0x20b2f
D.Demod F/W Ver. : 0x107
Debug Status : DEBUG
Access USB Status: 0/0(T)/0(C)
UTT : 4
APP History Ver.: 25682
Eye Q Gain : 5000
PQL DB : LGD_ALEF_SI2173_XXXXXX

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# 4. Manual Adjustment

* ADC adjustment is not needed because of OTP(Auto ADC adjustment)

## 4.1 EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

### 4.1.1. Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

### 4.1.2. Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjustment remote control

### 4.1.3. Download method

(1) Press "ADJ" key on the Adjustment remote control then select "10.EDID D/L", By pressing "Enter" key, enter EDID D/L menu.

(2) Select "Start" button by pressing "Enter" key, HDMI1/ HDMI2/ HDMI3/ HDMI4/ RGB are writing and display OK or NG.

| For Analog | For HDMI EDID |
|---|---|
| D-sub to D-sub | DVI-D to HDMI or HDMI to HDMI |
| | |

### 4.1.4. EDID DATA

▪ HDMI(FHD 3D, HDMI 1.4a, 3D)

| | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0x00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | ⓐⓓ | | ⓑ | | | |
| 0x01 | ⓒ | | 01 | 03 | 80 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 0x02 | 0F | 50 | 54 | A1 | 08 | 00 | 71 | 40 | 81 | C0 | 81 | 00 | 81 | 80 | 95 | 00 |
| 0x03 | 90 | 40 | A9 | C0 | B3 | 00 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 0x04 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 0x05 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 39 |
| 0x06 | 3F | 1F | 52 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | ⓓ | | | |
| 0x07 | ⓓ | | | | | | | | | | | | | | 01 | ⓔ1 |
| 0x00 | 02 | 03 | 37 | F1 | 4E | 90 | 1F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 | 21 |
| 0x01 | 22 | 15 | 01 | 26 | 15 | 07 | 50 | 09 | 57 | 07 | ⓕ | | | | | |
| 0x02 | ⓕ | | | | | | | | | | | | | | | |
| 0x03 | ⓕ | | | E3 | 05 | 03 | 01 | 02 | 3A | 80 | 18 | 71 | 1C | 38 | 2D | 40 |
| 0x04 | 2C | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 01 | 1D | 80 | 18 | 71 | 1C | 16 |
| 0x05 | 20 | 58 | 2C | 25 | 00 | A0 | 5A | 00 | 00 | 00 | 9E | 01 | 1D | 00 | 72 | 51 |
| 0x06 | D0 | 1E | 20 | 6E | 28 | 55 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 |
| 0x07 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | ⓔ2 |

▪ RGB

| | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0x00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | ⓐ | | ⓑ | | | |
| 0x01 | ⓒ | | 01 | 03 | 68 | 10 | 09 | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 0x02 | 0F | 50 | 54 | A1 | 08 | 00 | 71 | 40 | 81 | C0 | 81 | 00 | 81 | 80 | 95 | 00 |
| 0x03 | 90 | 40 | A9 | C0 | B3 | 00 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 0x04 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 0x05 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 3A |
| 0x06 | 3E | 1E | 53 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | ⓓ | | | |
| 0x07 | ⓓ | | | | | | | | | | | | | | 00 | ⓔ3 |

▪ Reference

- HDMI1 ~ HDMI4 / RGB
- In the data of EDID, bellows may be different by S/W or Input mode.

ⓐ Product ID
ⓑ Serial No: Controlled on production line.
ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' → '01'
Year : '2012' → '16'
ⓓ Model Name(Hex): LGTV
ⓔ Checksum(LG TV): Changeable by total EDID data.
ⓕ Vendor Specific(HDMI)

# HDMI 1(C/S : 9D BA)
EDID Block 0, Bytes 0-127 [00H-7FH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | 01 | 00 | 01 | 01 | 01 | 01 |
| 10 | 01 | 16 | 01 | 03 | 80 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 20 | 0F | 50 | 54 | A1 | 08 | 00 | 31 | 40 | 45 | 40 | 61 | 40 | 71 | 40 | 81 | 80 |
| 30 | 01 | 01 | 01 | 01 | 01 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 40 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 50 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 39 |
| 60 | 3F | 1F | 52 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC |
| 70 | 00 | 4C | 47 | 20 | 54 | 56 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 01 | 43 |

EDID Block 1, Bytes 128-255 [80H-FFH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 02 | 03 | 37 | F1 | 4E | 10 | 9F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 | 21 |
| 10 | 22 | 15 | 01 | 26 | 15 | 07 | 50 | 09 | 57 | 07 | 78 | 03 | 0C | 00 | 10 | 00 |
| 20 | B8 | 2D | 20 | C0 | 0E | 01 | 4F | 3F | FC | 08 | 10 | 18 | 10 | 06 | 10 | 16 |
| 30 | 10 | 28 | 10 | E3 | 05 | 03 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 |
| 40 | 2C | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 01 | 1D | 80 | 18 | 71 | 1C | 16 |
| 50 | 20 | 58 | 2C | 25 | 00 | A0 | 5A | 00 | 00 | 00 | 9E | 01 | 1D | 00 | 72 | 51 |
| 60 | D0 | 1E | 20 | 6E | 28 | 55 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 |
| 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 11 |

# HDMI 2(C/S : 9D AA)
EDID Block 0, Bytes 0-127 [00H-7FH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | 01 | 00 | 01 | 01 | 01 | 01 |
| 10 | 01 | 16 | 01 | 03 | 80 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 20 | 0F | 50 | 54 | A1 | 08 | 00 | 31 | 40 | 45 | 40 | 61 | 40 | 71 | 40 | 81 | 80 |
| 30 | 01 | 01 | 01 | 01 | 01 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 40 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 50 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 39 |
| 60 | 3F | 1F | 52 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC |
| 70 | 00 | 4C | 47 | 20 | 54 | 56 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 01 | 43 |

EDID Block 1, Bytes 128-255 [80H-FFH]

| 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 02 | 03 | 37 | F1 | 4E | 10 | 9F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 | 21 |
| 10 | 22 | 15 | 01 | 26 | 15 | 07 | 50 | 09 | 57 | 07 | 78 | 03 | 0C | 00 | 20 | 00 |
| 20 | B8 | 2D | 20 | C0 | 0E | 01 | 4F | 3F | FC | 08 | 10 | 18 | 10 | 06 | 10 | 16 |
| 30 | 10 | 28 | 10 | E3 | 05 | 03 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 |
| 40 | 2C | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 01 | 1D | 80 | 18 | 71 | 1C | 16 |
| 50 | 20 | 58 | 2C | 25 | 00 | A0 | 5A | 00 | 00 | 00 | 9E | 01 | 1D | 00 | 72 | 51 |
| 60 | D0 | 1E | 20 | 6E | 28 | 55 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 |
| 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 |

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# HDMI 3(C/S : 9D 9A)

EDID Block 0, Bytes 0-127 [00H-7FH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | 01 | 00 | 01 | 01 | 01 | 01 |
| 10 | 01 | 16 | 01 | 03 | 80 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 20 | 0F | 50 | 54 | A1 | 08 | 00 | 31 | 40 | 45 | 40 | 61 | 40 | 71 | 40 | 81 | 80 |
| 30 | 01 | 01 | 01 | 01 | 01 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 40 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 50 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 39 |
| 60 | 3F | 1F | 52 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC |
| 70 | 00 | 4C | 47 | 20 | 54 | 56 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 01 | 43 |

EDID Block 1, Bytes 128-255 [80H-FFH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 02 | 03 | 37 | F1 | 4E | 10 | 9F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 | 21 |
| 10 | 22 | 15 | 01 | 26 | 15 | 07 | 50 | 09 | 57 | 07 | 78 | 03 | 0C | 00 | 30 | 00 |
| 20 | B8 | 2D | 20 | C0 | 0E | 01 | 4F | 3F | FC | 08 | 10 | 18 | 10 | 06 | 10 | 16 |
| 30 | 10 | 28 | 10 | E3 | 05 | 03 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 |
| 40 | 2C | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 01 | 1D | 80 | 18 | 71 | 1C | 16 |
| 50 | 20 | 58 | 2C | 25 | 00 | A0 | 5A | 00 | 00 | 00 | 9E | 01 | 1D | 00 | 72 | 51 |
| 60 | D0 | 1E | 20 | 6E | 28 | 55 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 |
| 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | F1 |

# HDMI 4(C/S : 9D 8A)

EDID Block 0, Bytes 0-127 [00H-7FH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | 01 | 00 | 01 | 01 | 01 | 01 |
| 10 | 01 | 16 | 01 | 03 | 80 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 20 | 0F | 50 | 54 | A1 | 08 | 00 | 31 | 40 | 45 | 40 | 61 | 40 | 71 | 40 | 81 | 80 |
| 30 | 01 | 01 | 01 | 01 | 01 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 40 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 50 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 39 |
| 60 | 3F | 1F | 52 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC |
| 70 | 00 | 4C | 47 | 20 | 54 | 56 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 01 | 43 |

EDID Block 1, Bytes 128-255 [80H-FFH]

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 02 | 03 | 37 | F1 | 4E | 10 | 9F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 | 21 |
| 10 | 22 | 15 | 01 | 26 | 15 | 07 | 50 | 09 | 57 | 07 | 78 | 03 | 0C | 00 | 40 | 00 |
| 20 | B8 | 2D | 20 | C0 | 0E | 01 | 4F | 3F | FC | 08 | 10 | 18 | 10 | 06 | 10 | 16 |
| 30 | 10 | 28 | 10 | E3 | 05 | 03 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 |
| 40 | 2C | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 01 | 1D | 80 | 18 | 71 | 1C | 16 |
| 50 | 20 | 58 | 2C | 25 | 00 | A0 | 5A | 00 | 00 | 00 | 9E | 01 | 1D | 00 | 72 | 51 |
| 60 | D0 | 1E | 20 | 6E | 28 | 55 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 |
| 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | E1 |

# RGB(C/S : 97)

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | FF | FF | FF | FF | FF | FF | 00 | 1E | 6D | 01 | 00 | 01 | 01 | 01 | 01 |
| 10 | 01 | 16 | 01 | 03 | 68 | A0 | 5A | 78 | 0A | EE | 91 | A3 | 54 | 4C | 99 | 26 |
| 20 | 0F | 50 | 54 | A1 | 08 | 00 | 31 | 40 | 45 | 40 | 61 | 40 | 71 | 40 | 81 | 80 |
| 30 | 01 | 01 | 01 | 01 | 01 | 01 | 02 | 3A | 80 | 18 | 71 | 38 | 2D | 40 | 58 | 2C |
| 40 | 45 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 66 | 21 | 50 | B0 | 51 | 00 | 1B | 30 |
| 50 | 40 | 70 | 36 | 00 | A0 | 5A | 00 | 00 | 00 | 1E | 00 | 00 | 00 | FD | 00 | 3A |
| 60 | 3E | 1E | 53 | 10 | 00 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 00 | 00 | FC |
| 70 | 00 | 4C | 47 | 20 | 54 | 56 | 0A | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 00 | 5C |

# 4.2. White Balance Adjustment

## 4.2.1. Overview

▪ W/B adj. Objective & How-it-works

(1) Objective: To reduce each Panel's W/B deviation

(2) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.

(3) Adjustment condition : normal temperature

1) Surrounding Temperature : 25 °C ± 5 °C

2) Warm-up time: About 5 Min

3) Surrounding Humidity : 20 % ~ 80 %

## 4.2.2. Equipment

(1) Color Analyzer: CA-210 (LED Module : CH 14)

(2) Adjustment Computer(During auto adj., RS-232C protocol is needed)

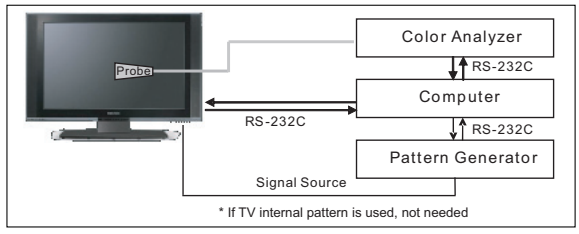
(3) Adjustment Remote control

(4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

→ Only when internal pattern is not available

▪ Color Analyzer Matrix should be calibrated using CS-1000.

## 4.2.3. Equipment connection MAP




## 4.2.4. Adj. Command (Protocol)

<Command Format>

| START | 6E | A | 50 | A | LEN | A | 03 | A | CMD | A | 00 | A | VAL | A | CS | STOP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

- LEN: Number of Data Byte to be sent
- CMD: Command
- VAL: FOS Data value
- CS: Checksum of sent data
- A: Acknowledge

Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

▪ RS-232C Command used during auto-adjustment.

| RS-232C COMMAND [CMD | ID | DATA] | Explantion |
|---|---|---|---|
| wb | 00 | 00 | Begin White Balance adjustment |
| wb | 00 | 10 | Gain adjustment(internal white pattern) |
| wb | 00 | 1f | Gain adjustment completed |
| wb | 00 | 20 | Offset adjustment(internal white pattern) |
| wb | 00 | 2f | Offset adjustment completed |
| wb | 00 | ff | End White Balance adjustment (internal pattern disappears ) |

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Ex) wb 00 00 -> Begin white balance auto-adj.
wb 00 10 -> Gain adj.
ja 00 ff -> Adj. data
jb 00 c0
...
...
wb 00 1f → Gain adj. completed
*(wb 00 20(Start), wb 00 2f(end)) → Off-set adj.
wb 00 ff → End white balance auto-adj.

▪ Adj. Map

| | Adj. item | Command (lower caseASCII) | | Data Range (Hex.) | | Default (Decimal) |
|---|---|---|---|---|---|---|
| | | CMD1 | CMD2 | MIN | MAX | |
| Cool | R Gain | j | g | 00 | C0 | |
| | G Gain | j | h | 00 | C0 | |
| | B Gain | j | i | 00 | C0 | |
| | R Cut | | | | | |
| | G Cut | | | | | |
| | B Cut | | | | | |
| Medium | R Gain | j | a | 00 | C0 | |
| | G Gain | j | b | 00 | C0 | |
| | B Gain | j | c | 00 | C0 | |
| | R Cut | | | | | |
| | G Cut | | | | | |
| | B Cut | | | | | |
| Warm | R Gain | j | d | 00 | C0 | |
| | G Gain | j | e | 00 | C0 | |
| | B Gain | j | f | 00 | C0 | |
| | R Cut | | | | | |
| | G Cut | | | | | |

### 4.2.5. Adj. method

(1) Auto adj. method
1) Set TV in adj. mode using POWER ON key.
2) Zero calibrate probe then place it on the center of the Display.
3) Connect Cable.(RS-232C to USB)
4) Select mode in adj. Program and begin adj.
5) When adj. is complete (OK Sign), check adj. status pre mode. (Warm, Medium, Cool)
6) Remove probe and RS-232C cable to complete adj.
▪ W/B Adj. must begin as start command “wb 00 00” , and finish as end command “wb 00 ff”, and Adj. offset if need.

(2) Manual adjustment. method
1) Set TV in Adj. mode using POWER ON.
2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10 cm of the surface.
3) Press ADJ key → EZ adjust using adj. R/C → 7. White-Balance then press the cursor to the right(key ►).
(When right key(►) is pressed 216 Gray internal pattern will be displayed)
4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
5) Adjustment is performed in COOL, MEDIUM, WARM 3 modes of color temperature.
▪ If internal pattern is not available, use RF input. In EZ Adj. menu 7.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

▪ Adjustment condition and cautionary items
1) Lighting condition in surrounding area
Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
2) Probe location
: Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface (80° ~ 100°)
3) Aging time
- After Aging Start, Keep the Power ON status during 5 Minutes.
- In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

### 4.2.6. Reference (White balance Adj. coordinate and color temperature)

▪ Luminance : 216 Gray
▪ Standard color coordinate and temperature using CS-1000 (over 26 inch)

| Mode | Coordinate | | Temp | Δuv |
|---|---|---|---|---|
| | x | y | | |
| Cool | 0.269 | 0.273 | 13000 K | 0.0000 |
| Medium | 0.285 | 0.293 | 9300 K | 0.0000 |
| Warm | 0.313 | 0.329 | 6500 K | 0.0000 |

▪ Standard color coordinate and temperature using CA-210(CH 18)

| Mode | Coordinate | | Temp | Δuv |
|---|---|---|---|---|
| | x | y | | |
| Cool | 0.269 ± 0.002 | 0.273 ± 0.002 | 13000 K | 0.0000 |
| Medium | 0.285 ± 0.002 | 0.293 ± 0.002 | 9300 K | 0.0000 |
| Warm | 0.313 ± 0.002 | 0.329 ± 0.002 | 6500K | 0.0000 |

### 4.2.7. ALELF & EDGE LED White balance table

- EDGE LED module change color coordinate because of aging time.
- Apply under the color coordinate table, for compensated aging time.
- ALEF(55LM960*)

| GP4 | Aging time (Min) | Cool | | Medium | | Warm | |
|---|---|---|---|---|---|---|---|
| | | X | y | x | y | x | y |
| | | 269 | 273 | 285 | 293 | 313 | 329 |
| 1 | 20 | 282 | 298 | 298 | 318 | 319 | 344 |
| 2 | 21-25 | 280 | 296 | 296 | 316 | 317 | 342 |
| 3 | 26-30 | 279 | 294 | 295 | 314 | 316 | 340 |
| 4 | 31-35 | 277 | 292 | 293 | 312 | 314 | 338 |
| 5 | 36-40 | 276 | 290 | 292 | 310 | 313 | 336 |
| 6 | 41-50 | 275 | 288 | 291 | 308 | 312 | 334 |
| 7 | 51-80 | 272 | 284 | 288 | 304 | 309 | 330 |
| 8 | 81-119 | 271 | 282 | 287 | 302 | 308 | 328 |
| 9 | Over 120 | 270 | 281 | 286 | 301 | 307 | 327 |

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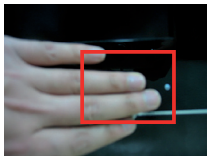
## 4.3. EYE-Q function check

(1) Turn on TV.

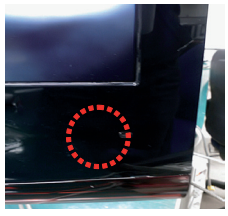
(2) Press EYE key of Adjustment remote control.

(3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds.



(4) Confirm that R/G/B value is lower than 10 of the "Raw Data (Sensor data, Back light)". If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.

(5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.



(6) Confirm that "ok" pop up. If change is not seen, replace Eye Q II sensor.

## 4.4. Local Dimming Function Check

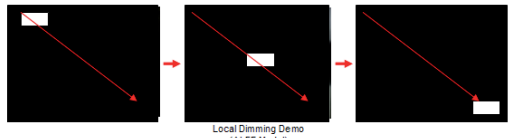
Step 1) Turn on TV.

Step 2) At the Local Dimming mode, module Edge Backlight moving right to left Back light of IOP module moving.

Step 3) Confirm the Local Dimming mode.

Step 4) Press "exit" key.

Local Dimming Demo
(Edge LED Model)



Local Dimming Demo
(ALEF Model)

## 4.5. Magic Motion Remote control test

(1) Equipment : RF Remote control for test, IR-KEY-Code Remote control for test

(2) You must confirm the battery power of RF-Remote control before test(recommend that change the battery per every lot)

(3) Sequence (test)

1) if you select the "Start(Mute)" key on the Adjustment remote control, you can pairing with the TV SET.
2) You can check the cursor on the TV Screen, when select the "OK" key on the Adjustment remote control.
3) You must remove the pairing with the TV Set by select "OK" key + "Mute" key on the Adjustment remote control for 5 seconds.

## 4.6. 3D function test

(Pattern Generator MSHG-600, MSPG-6100[Support HDMI1.4])

* HDMI mode NO. 872 , pattern No.83

(1) Please input 3D test pattern like below.

(2) When 3D OSD appear automatically, then select OK key.

(3) Don't wear a 3D Glasses, check the picture like below.

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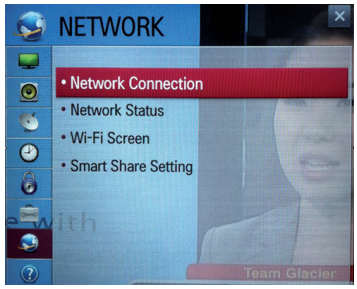
## 4.7. Wi-Fi Test

Step 1) Turn on TV

Step 2) Select Network Connection option in Network Menu.




Step 3) Select Start Connection button in Network Connection.

Step 4) If the system finds any AP like blow PIC, it is working well.

## 4.8. LNB voltage and 22KHz tone check

(only for DVB-S/S2 model)

▪ Test method

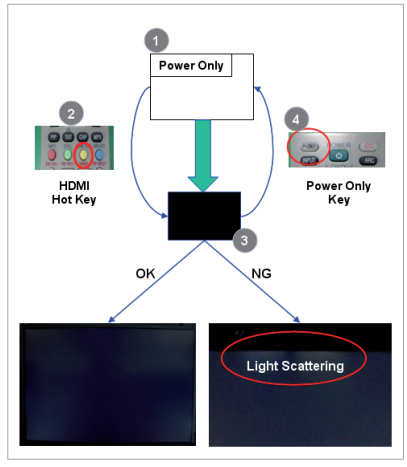
(1) Set TV in Adj. mode using POWER ON.
(2) Connect cable between satellite ANT and test JIG.
(3) Press Yellow key(ETC+SWAP) in Adj Remote control to make LNB on.
(4) Check LED light 'ON' at 18 V menu.
(5) Check LED light 'ON' at 22 KHz tone menu.
(6) Press Blue key(ETC+PIP INPUT) in Adj Remote control to make LNB off.
(7) Check LED light 'OFF' at 18 V menu.
(8) Check LED light 'OFF' at 22 KHz tone menu.

▪ Test result

(1) After press LNB On key, '18 V LED' and '22 KHz tone LED' should be ON.
(2) After press LNB OFF key, '18 V LED' and '22 KHz tone LED' should be OFF.

## 4.9. Inspection of light scattering

▪ Test Method




(1) Push "Power only" key.
(2) Push "HDMI" hot key.
(3) Inspect whether light scattering is occurred in internal black pattern or not.
(4) Push "Power only" key.

## 4.10. Option selection per country

### 4.10.1. Overview

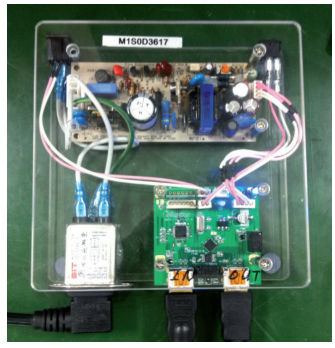
- Option selection is only done for models in Non-EU

### 4.10.2. Method

(1) Press ADJ key on the Adj. R/C, then select Country Group Meun
(2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ key.

## 4.11. MHL Test

(1) Turn on TV
(2) Select HDMI4 mode using input Menu.
(3) Set MHL Zig(M1S0D3617) using MHL input, output and power cord.
(4) Connect HDMI cable between MHL Zig and HDMI4 port.
(5) Check LED light of Zig and Module of Set.




Result) If, The LED light is green and The Module shows normal stream → OK, Else → NG

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# 5. Tool Option selection

▪ Method : Press "ADJ" key on the Adjustment remote control, then select Tool option.

# 6. Ship-out mode check(In-stop)

▪ After final inspection, press "IN-STOP" key of the Adjustment remote control and check that the unit goes to Stand-by mode.

# 7. GND and Internal Pressure check

## 7.1. Method

(1) GND & Internal Pressure auto-check preparation
- Check that Power cord is fully inserted to the SET. (If loose, re-insert)

(2) Perform GND & Internal Pressure auto-check
- Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
- Connect D-terminal to AV JACK TESTER
- Auto CONTROLLER(GWS103-4) ON
- Perform GND TEST
- If NG, Buzzer will sound to inform the operator.
- If OK, changeover to I/P check automatically. (Remove CORD, A/V form AV JACK BOX.)
- Perform I/P test
- If NG, Buzzer will sound to inform the operator.
- If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

## 7.2. Checkpoint

▪ TEST voltage
- GND: 1.5 KV / min at 100 mA
- SIGNAL: 3 KV / min at 100 mA

▪ TEST time: 1 second

▪ TEST POINT
- GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
- Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL

▪ LEAKAGE CURRENT: At 0.5 mArms

# 8. Audio

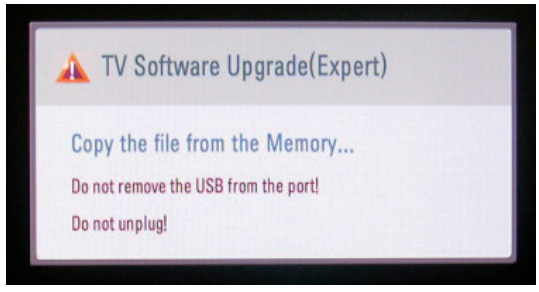
| No. | Item | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|
| 1. | Audio practical max Output, L/R (Distortion=10% max Output) | 9.0 | 10.0 | 12.0 | W | Measurement condition<br>Auto Volume :Off<br>Audio EQ : Off<br>Clear Voice : Off<br>Virtual Surround:Off |
| | | 8.5 | 8.9 | 9.8 | Vrms | |
| 2. | Speaker (8Ω Impedance) | | 10.0 | 15.0 | W | |

Measurement condition:
(1) RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
(2) CVBS, Component: 1 KHz sine wave signal 0.5 Vrms
(3) RGB PC: 1 KHz sine wave signal 0.7 Vrms

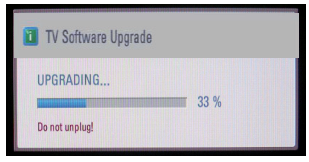
# 9. USB S/W Download(Service only)

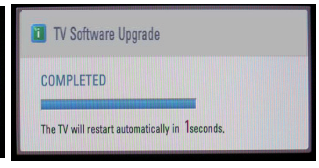
(1) Put the USB Stick to the USB socket.
(2) Automatically detecting update file in USB Stick.
- If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.(Download Version High & Power only mode, Set is automatically Download)

(3) Show the message "Copying files from memory".




(4) Updating is starting.
(5) Updating Completed, The TV will restart automatically.




(6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)

* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ ATV test on production line.

* After downloading, have to adjust Tool Option again.
(1) Push "IN-START" key in service remote control.
(2) Select "Tool Option 1" and push "OK" key.
(3) Punch in the number. (Each model has their number)

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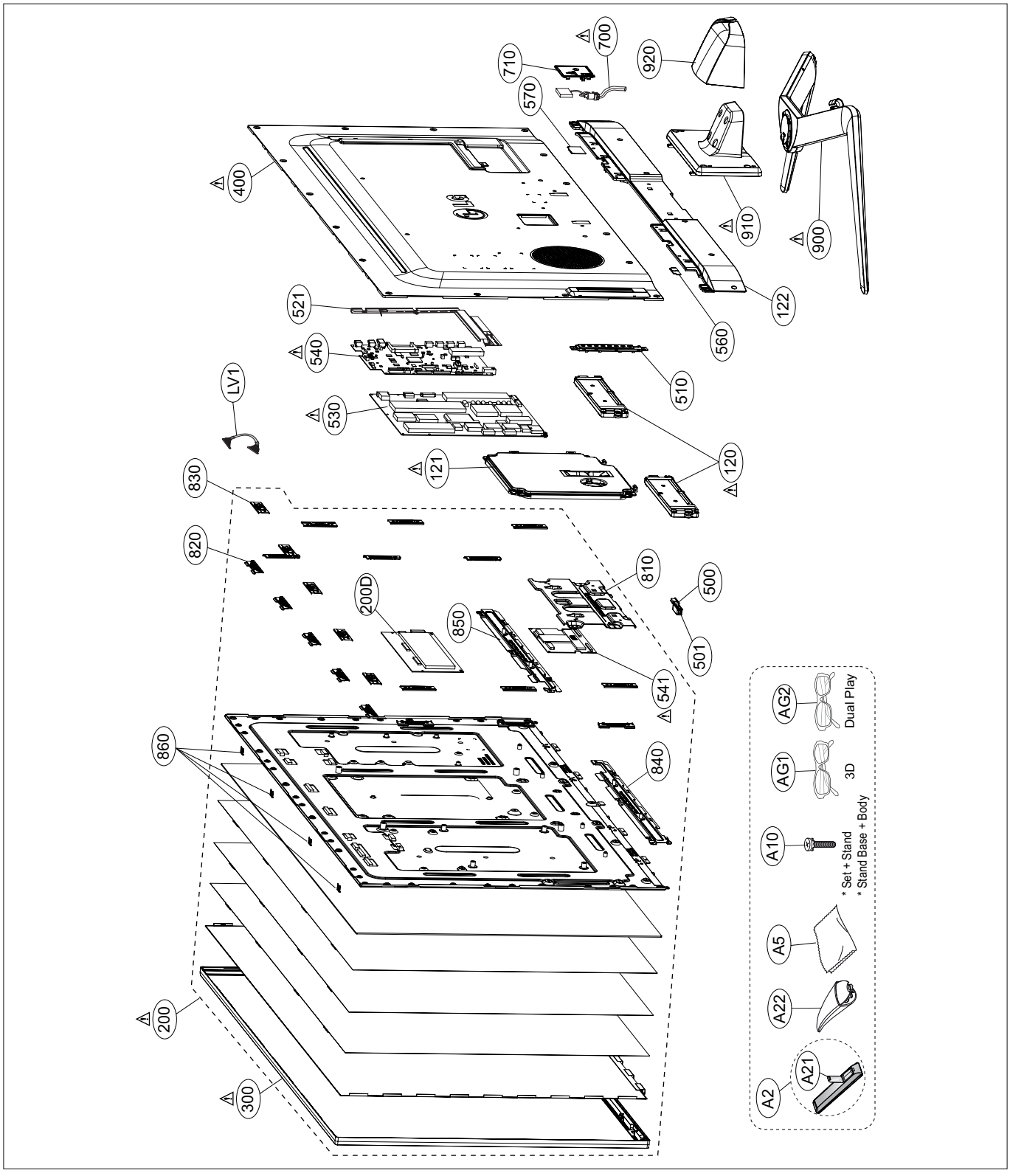
# EXPLODED VIEW

**IMPORTANT SAFETY NOTICE**

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

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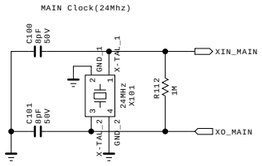
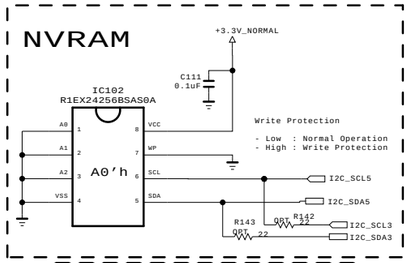
# System Configuration

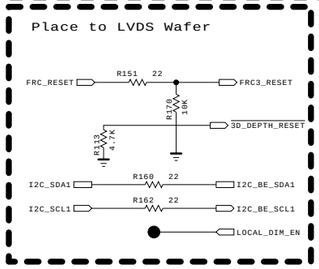
## Clock for LG1152




## NVRAM

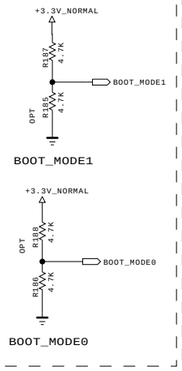



## Place to LVDS Wafer

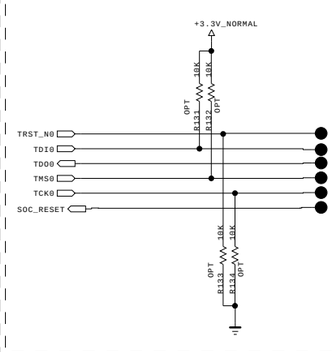


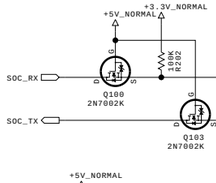

PLL SET[1:0] ==> Internal Pull-UP. N.C is high
00 : CPU clock(1056Mhz), Main0,1/2 DDR (792/792 Mhz)
01 : CPU clock(792Mhz), Main0,1/2 DDR (672/792 Mhz)
10 : CPU clock(1152Mhz), Main0,1/2 DDR (792/672 Mhz)
11 : CPU clock(984Mhz), Main0,1/2 DDR (792/792 Mhz)

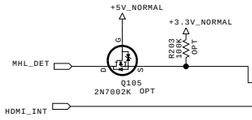
BOOT MODE
"11" or "01" : NOR
"10" : eMMC
"00" : NAND

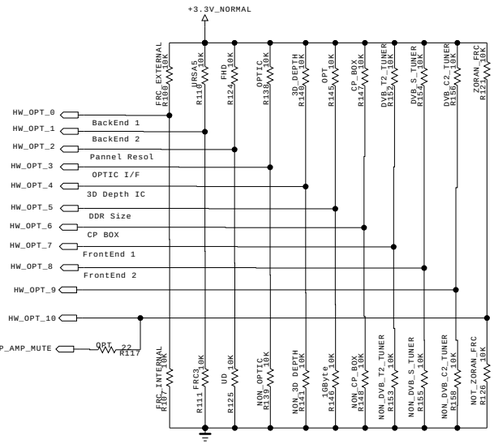



## JTAG I/F FOR MAIN



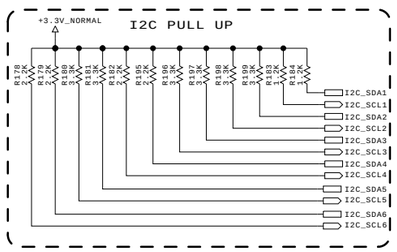



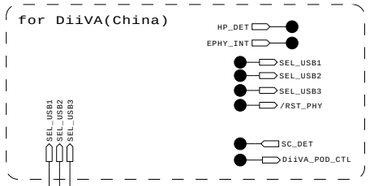

| | NO_FRC | SoC internal FRC | LG FRC3 | URSA5 |
|---|---|---|---|---|
| MODEL_OPT_0 | 0 | 0 | 1 | 1 |
| MODEL_OPT_1 | 0 | 1 | 0 | 1 |

| | | HIGH | LOW |
|---|---|---|---|
| MODEL_OPT_2 | | FHD | UD |
| MODEL_OPT_3 | | OPTIC | NON_OPTIC |
| MODEL_OPT_4 | 3D DEPTH | 3D_Depth_IC | NON_3D_Depth_IC |
| MODEL_OPT_5 | DDR | Reserved | DDR_Default |
| MODEL_OPT_6 | CP BOX | Enable | Disable |
| MODEL_OPT_7 | T2 Tuner | Support | Not Support |
| MODEL_OPT_8 | S Tuner | Support | Not Support |
| MODEL_OPT_9 | C2 Tuner | Support | Not Support |
| MODEL_OPT_10 | Zoran FRC (For UD) | Support | Not Support |

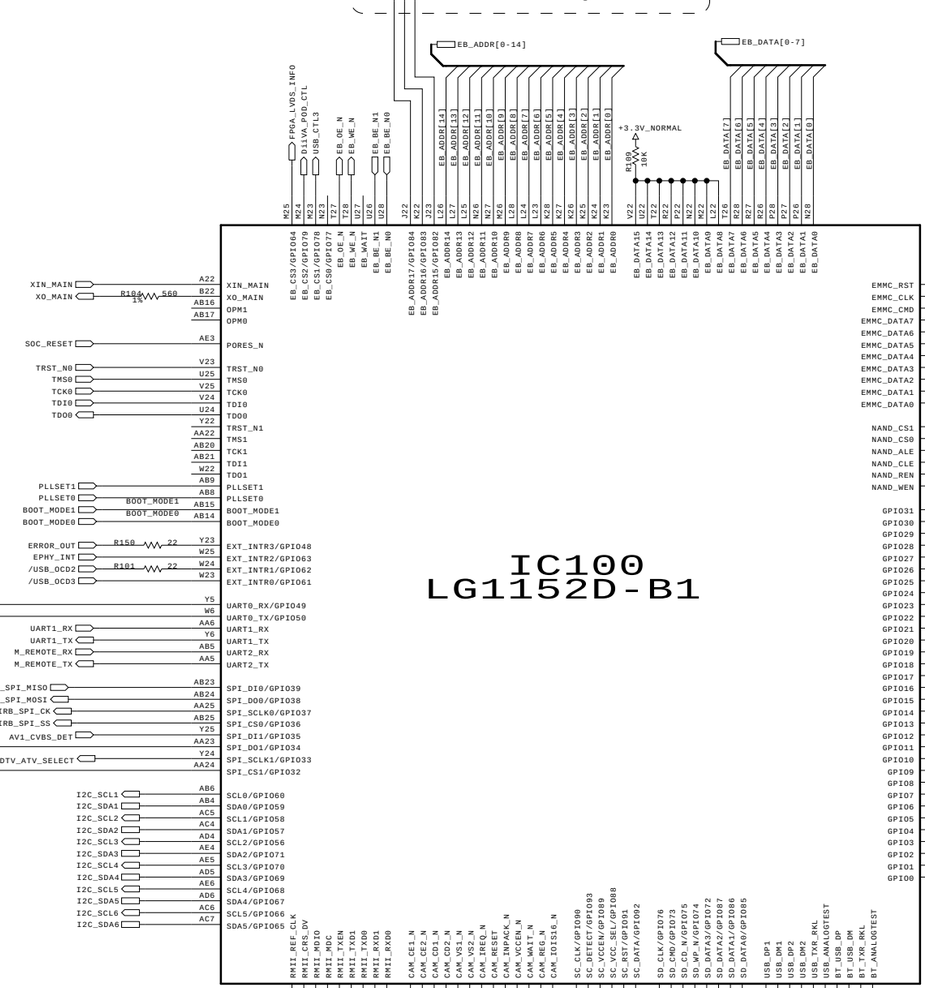
MODEL OPTION 8 is just for CP Box
It should not be appiled at MP

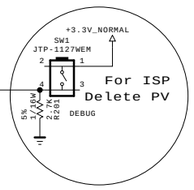


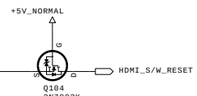

## for DiiVA(China)

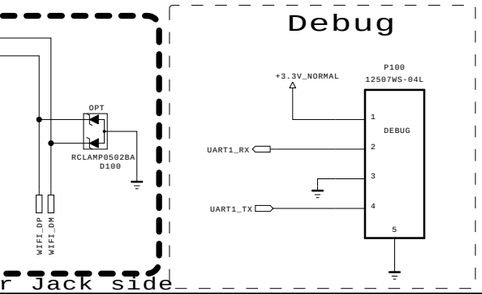



## IC100
## LG1152D-B1




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

| | | | |
|---|---|---|---|
| MODEL | LG1152 B1 | DATE | |
| BLOCK | MAIN & GPIO | SHEET | 1 |

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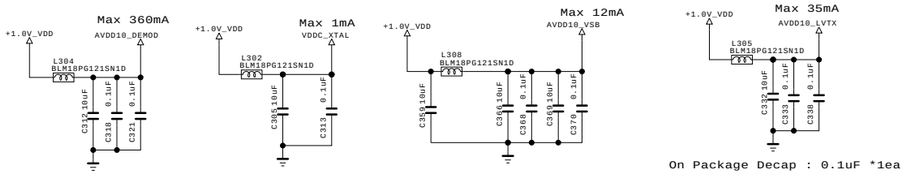
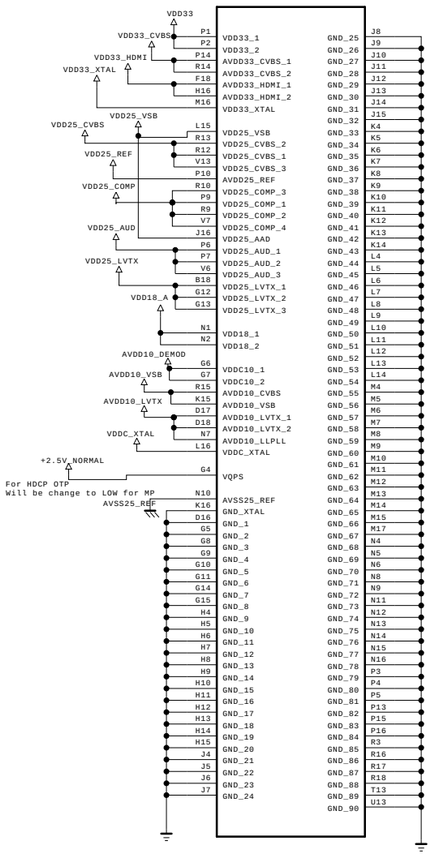
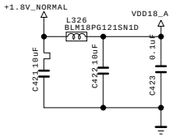


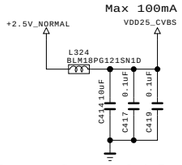

On Package Decap : 0.1uF *1ea

# LG1152A

IC101
LG1152AN-B2

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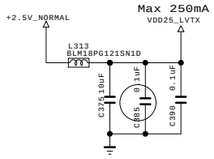


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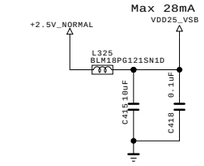


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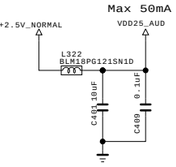


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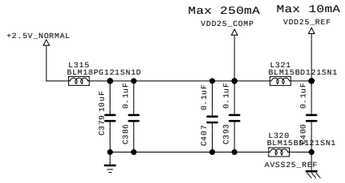


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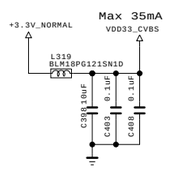


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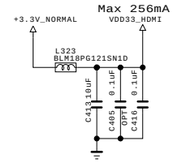


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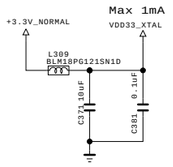


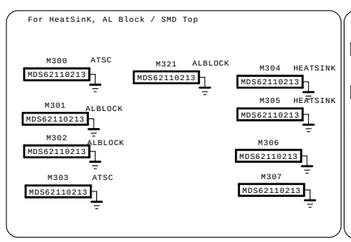


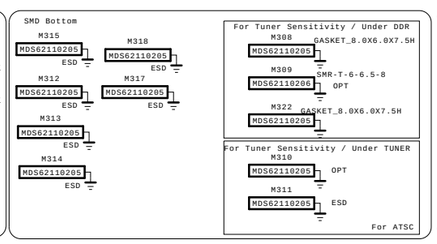


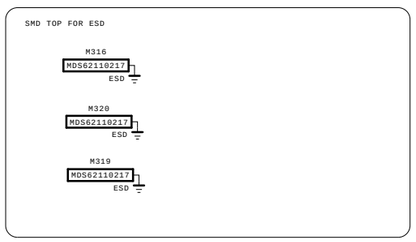


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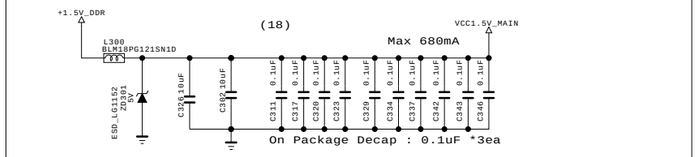
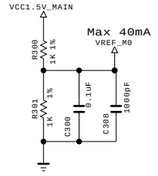
## +1.5V_Bypass Cap




On Package Decap : 0.1uF *3ea

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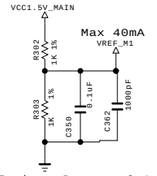


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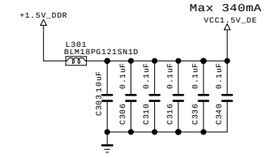


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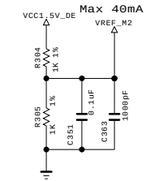


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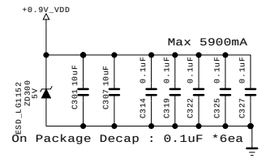


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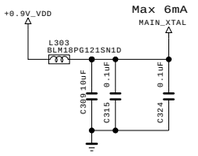


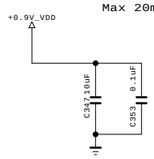


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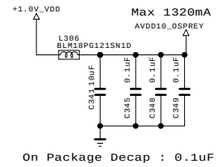


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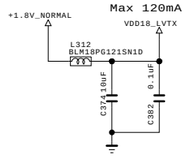


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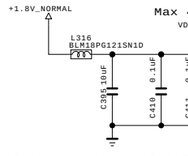


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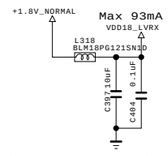


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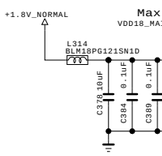


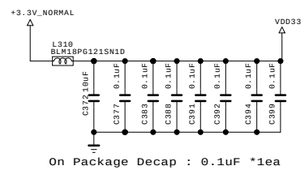


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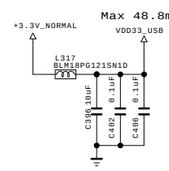
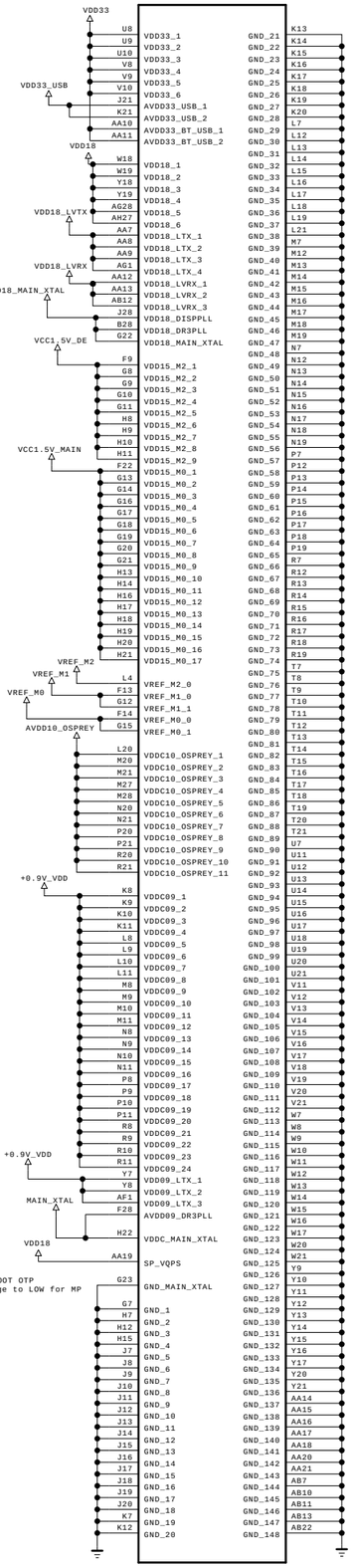



# LG1152D

IC100
LG1152D-B1

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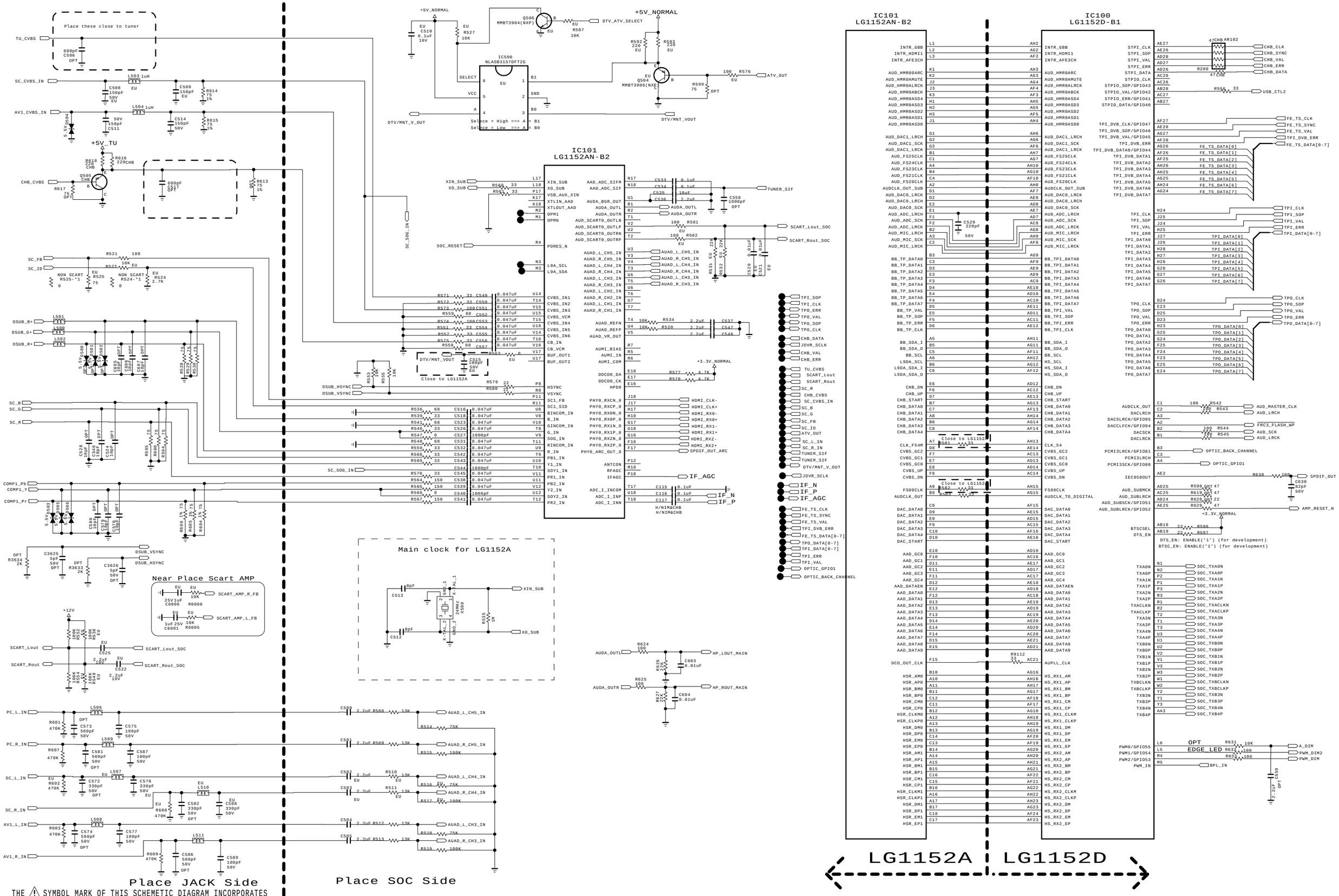


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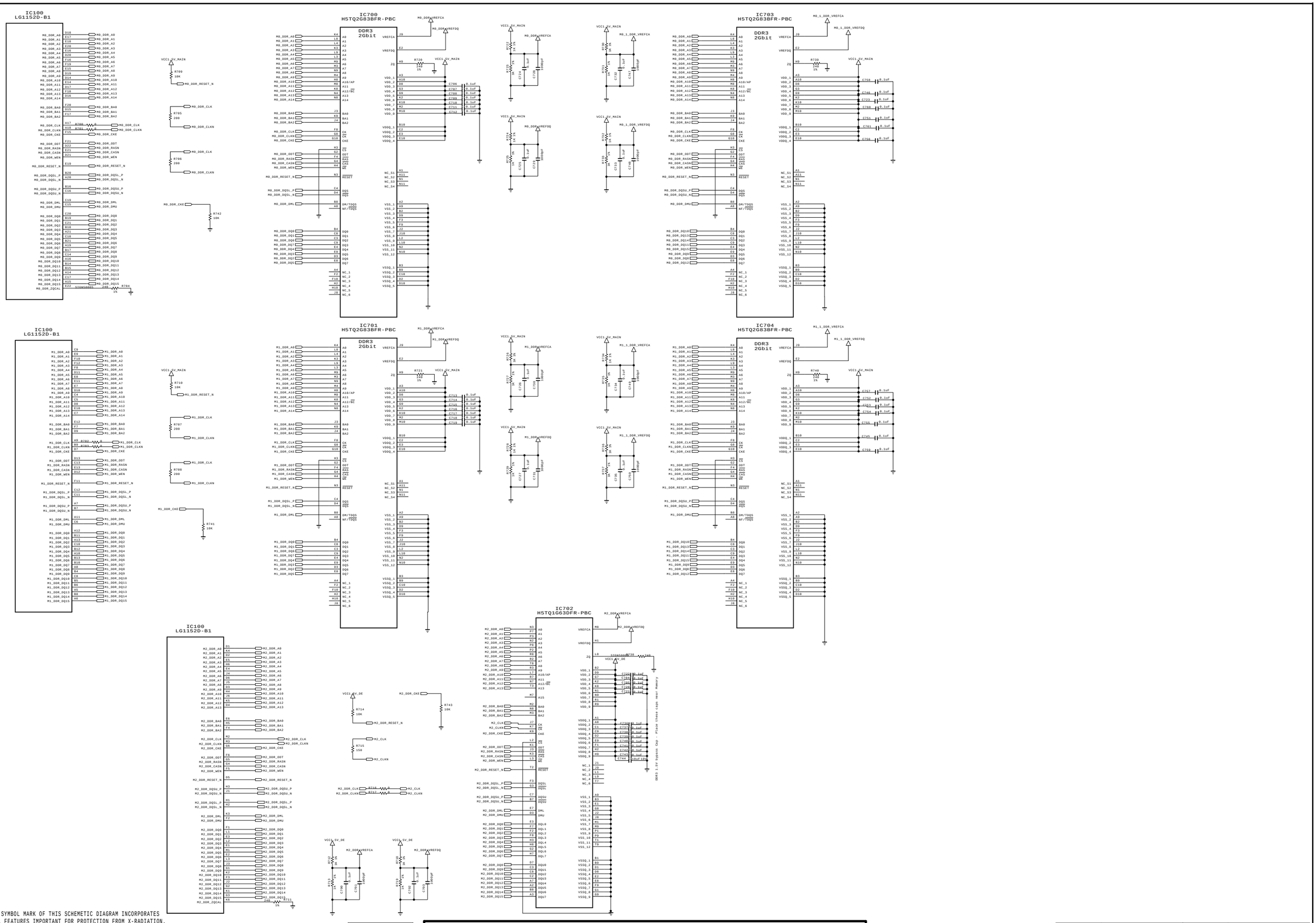


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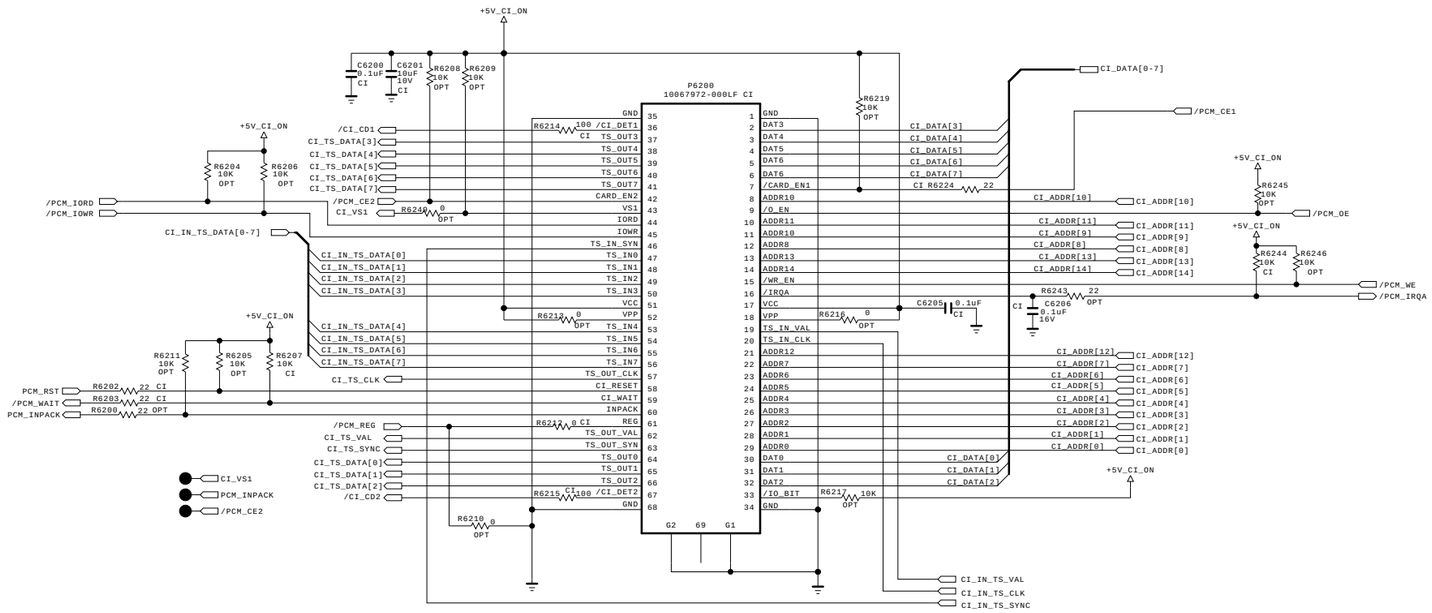
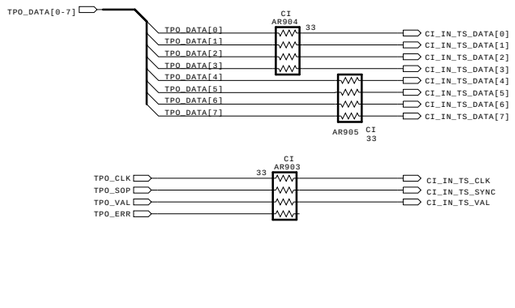
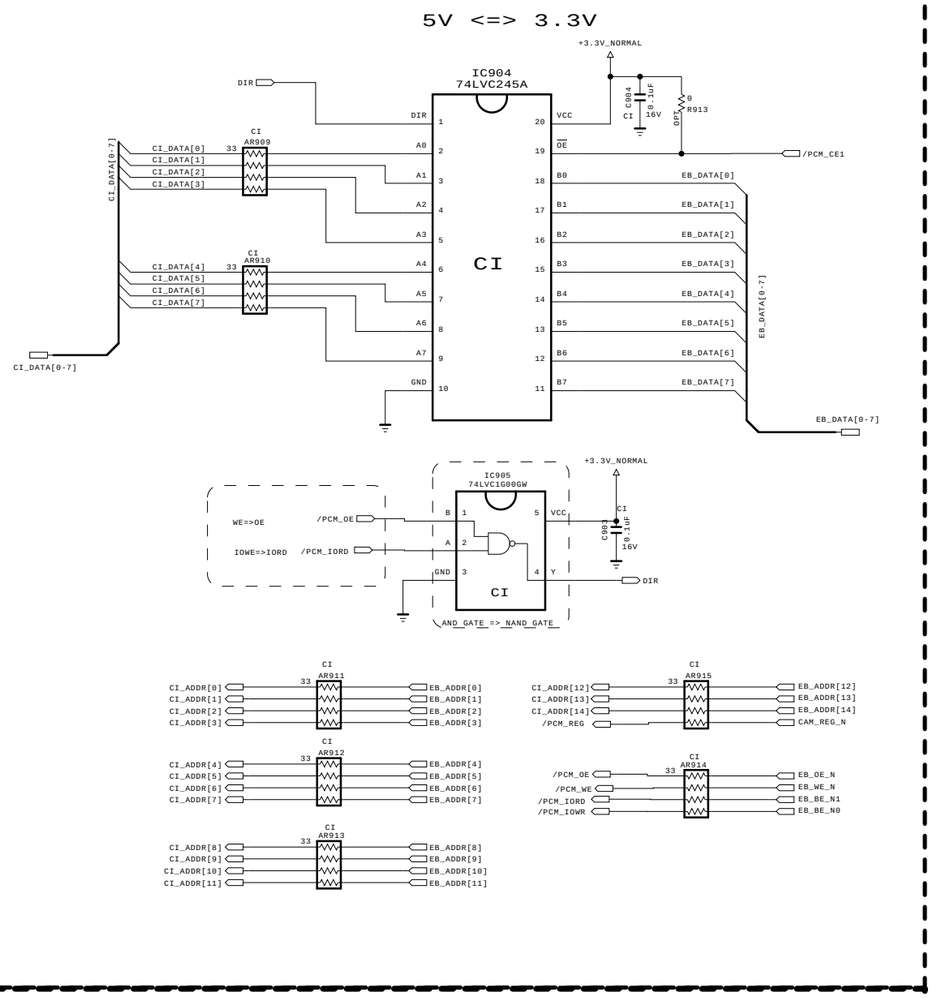
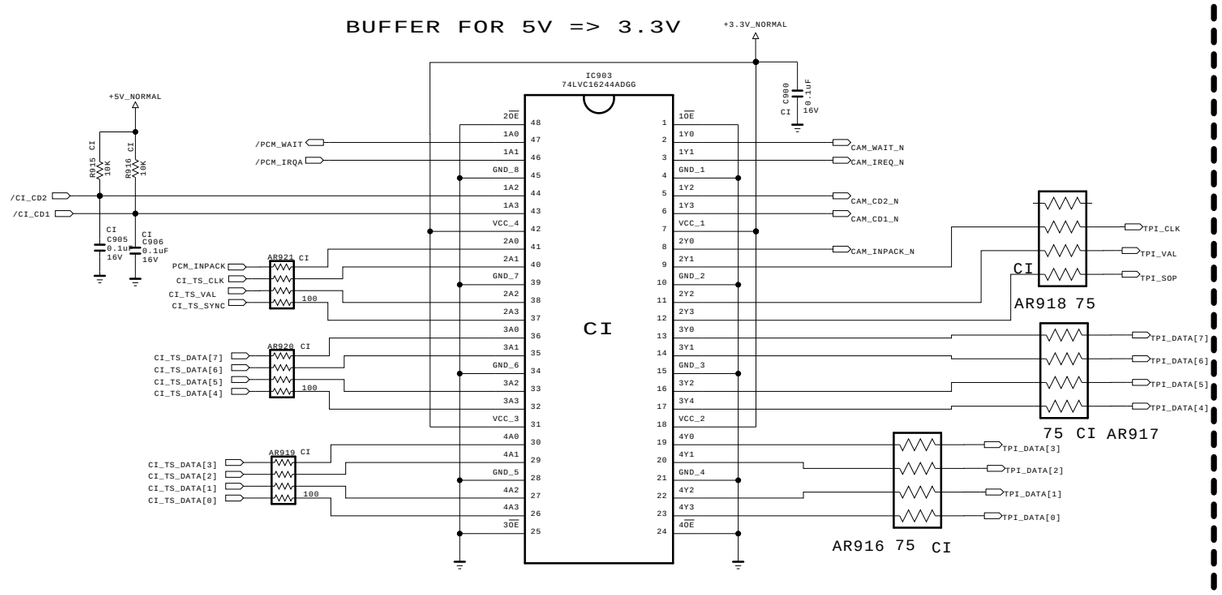



CI HOST I/F




BUFFER FOR 5V => 3.3V

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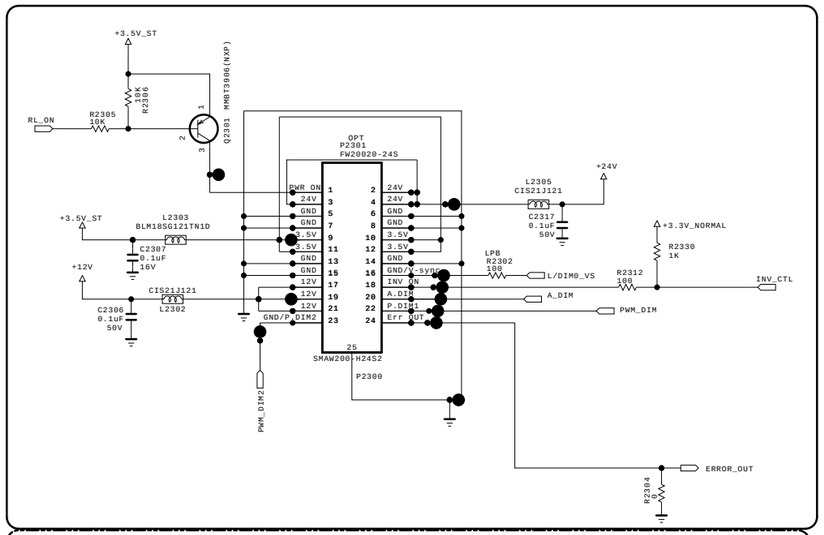


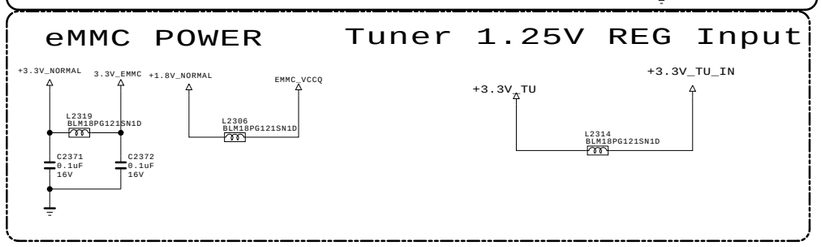


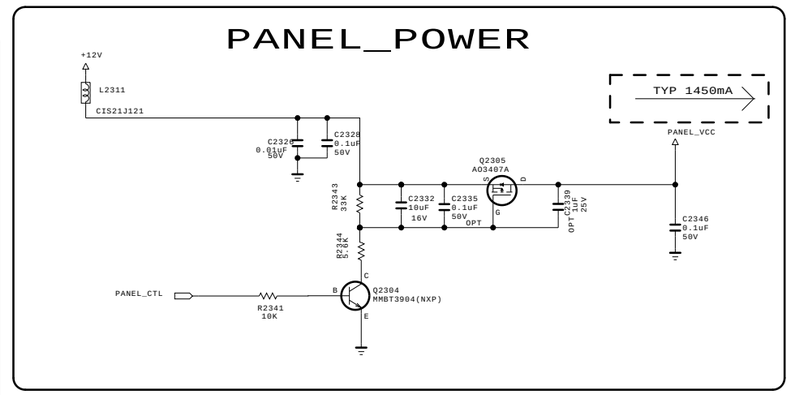


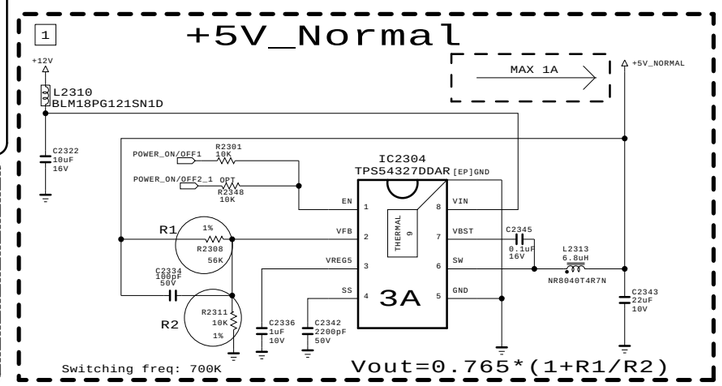


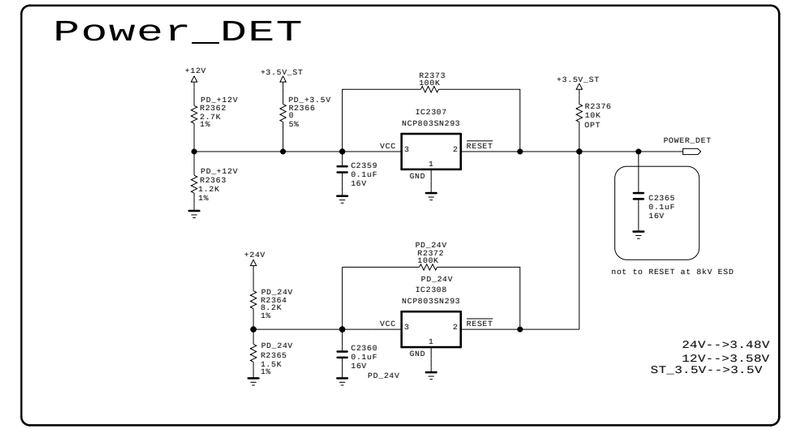


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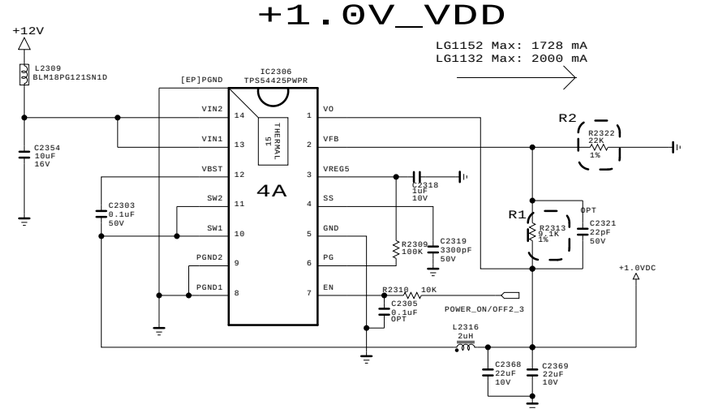


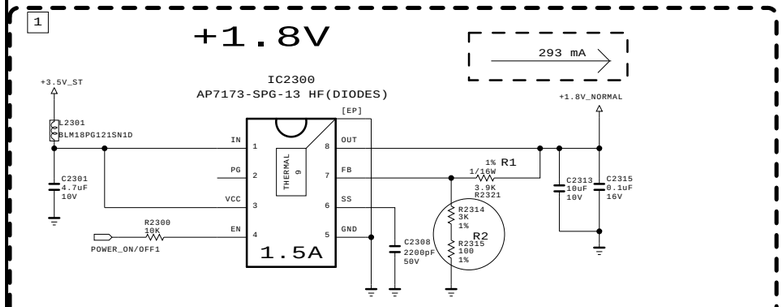


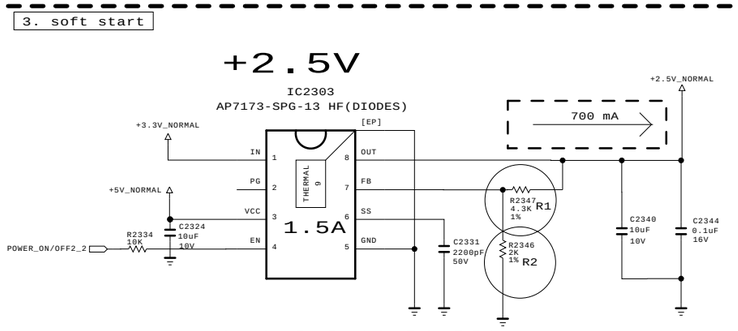


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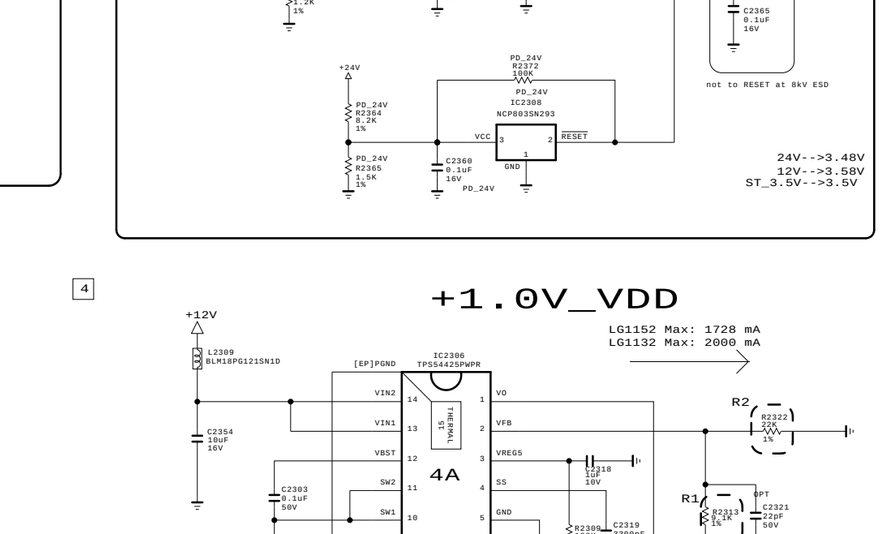


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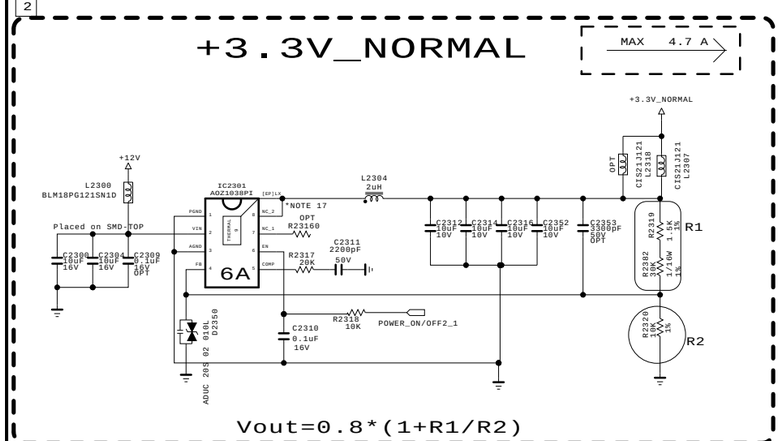


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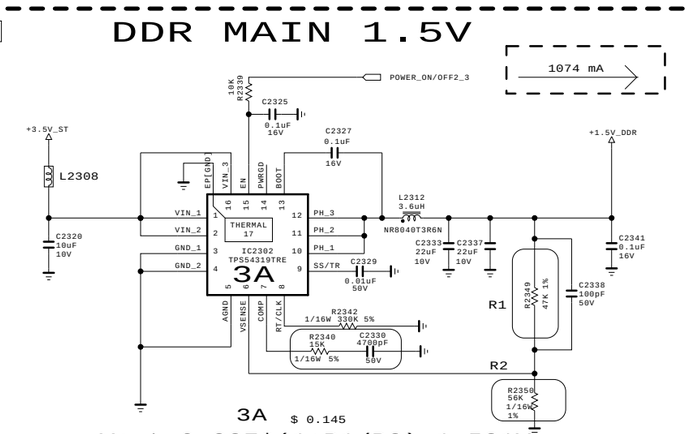


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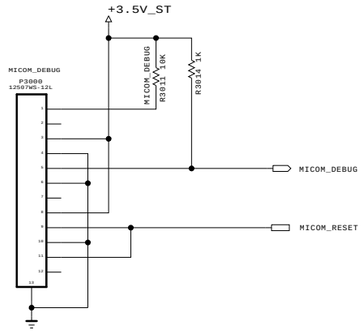
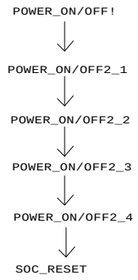
# Renesas MICOM

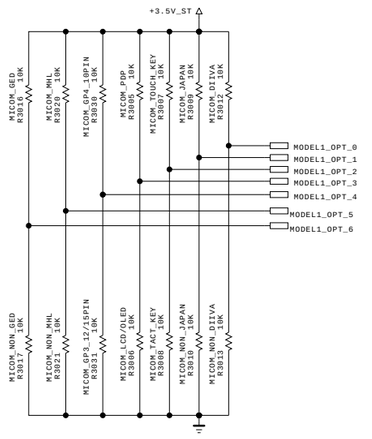
## For Debug




## GP4 High/MID Power SEQUENCE




## MICOM MODEL OPTION

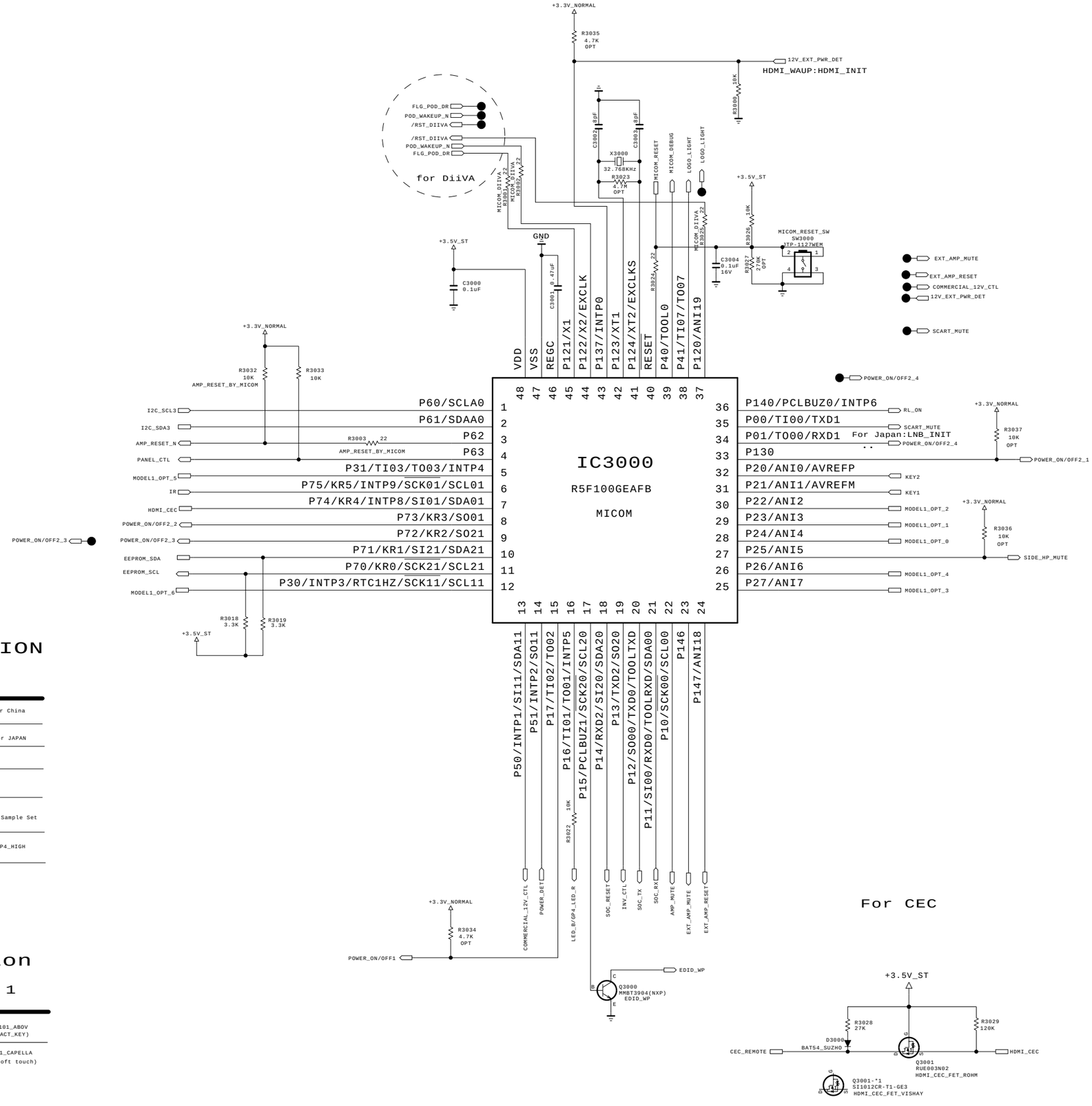



## MICOM MODEL OPTION

| | 0 | 1 | |
|---|---|---|---|
| MODEL_OPT_0 | NON DIVA | DIVA | For China |
| MODEL_OPT_1 | NON JAPAN | JAPAN | For JAPAN |
| MODEL_OPT_2 | TACT_KEY | TOUCH_KEY | |
| MODEL_OPT_3 | LCD / OLED | PDP | |
| MODEL_OPT_4 | IR Wafer 12/15Pin (GP3_Soft touch) | IR Wafer 10Pin (GP4_TOOL) | For Sample Set |
| MODEL_OPT_5 | NON_MHL | MHL | GP4_HIGH |
| MODEL_OPT_6 | NON_GED | GED | |

## Eye Sensor Option

| MODEL_OPT_4 / MODEL_OPT_2 | 0 | 1 |
|---|---|---|
| 0 | N/A | MC8101_ABOV (TACT_KEY) |
| 1 | CM3231_CAPELLA (GP3 Soft touch) | CM3231_CAPELLA (GP4 Soft touch) |

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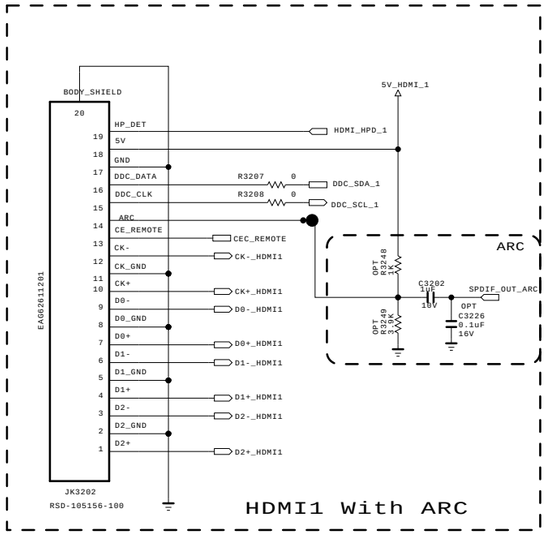


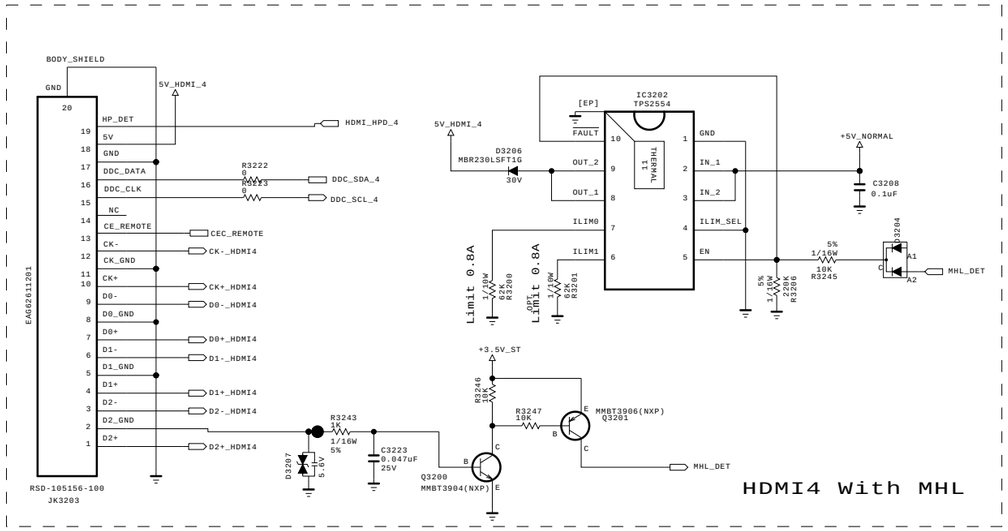


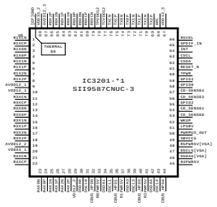


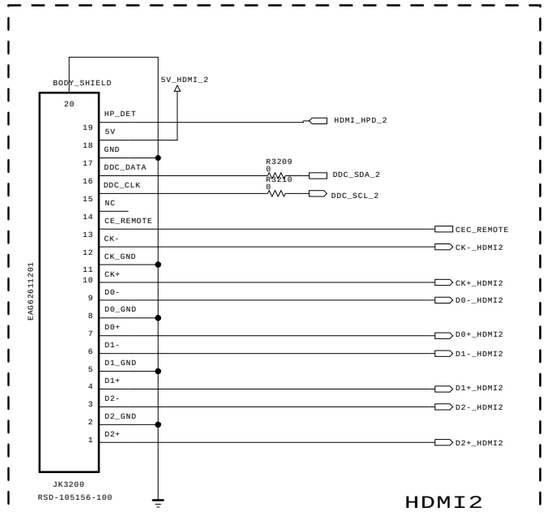





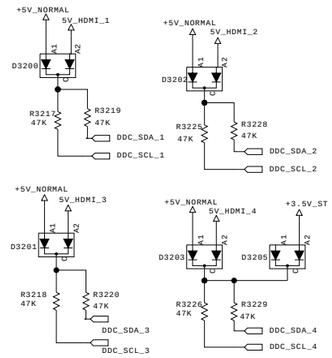


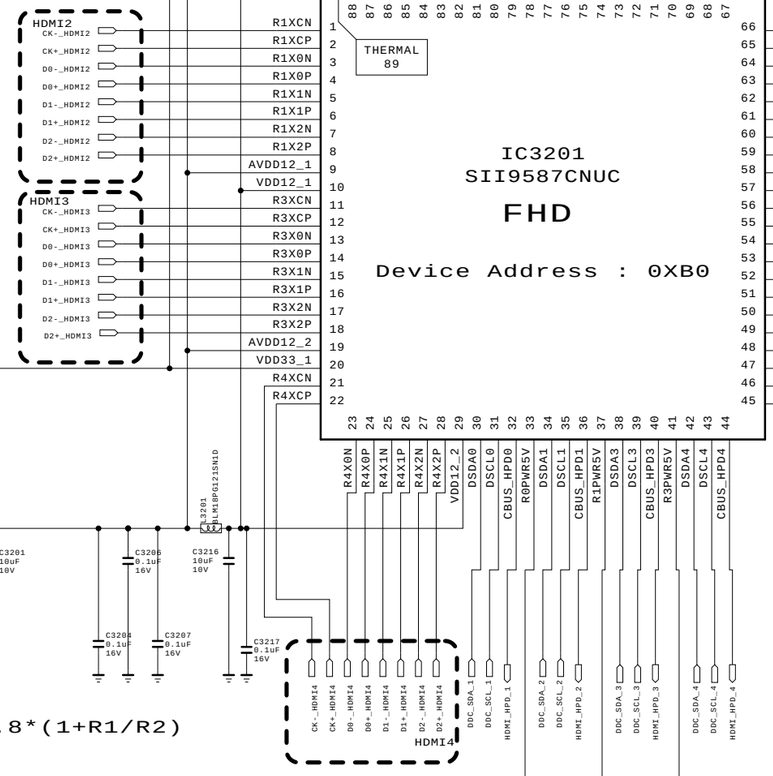


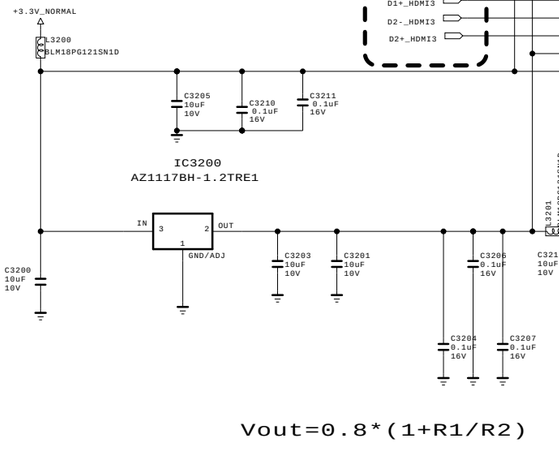


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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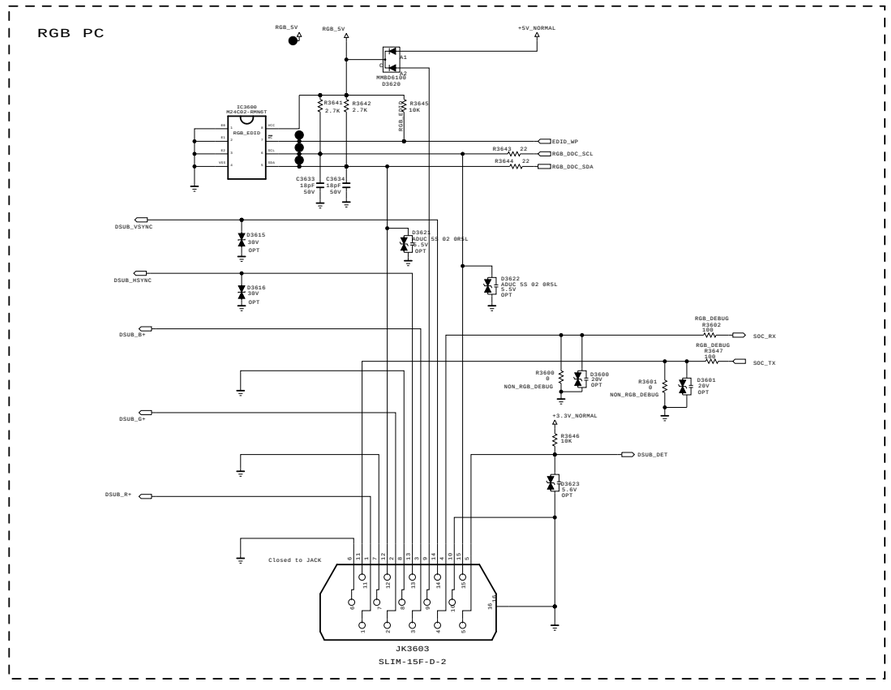
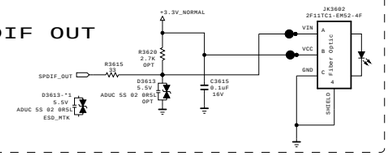
# RGB/ PC AUDIO/ SPDIF

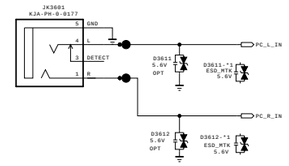
RGB PC




SPDIF OUT




PC AUDIO

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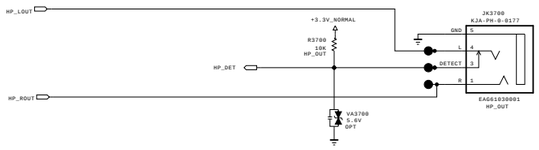


ESD for MTK

ESD for LG1152

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
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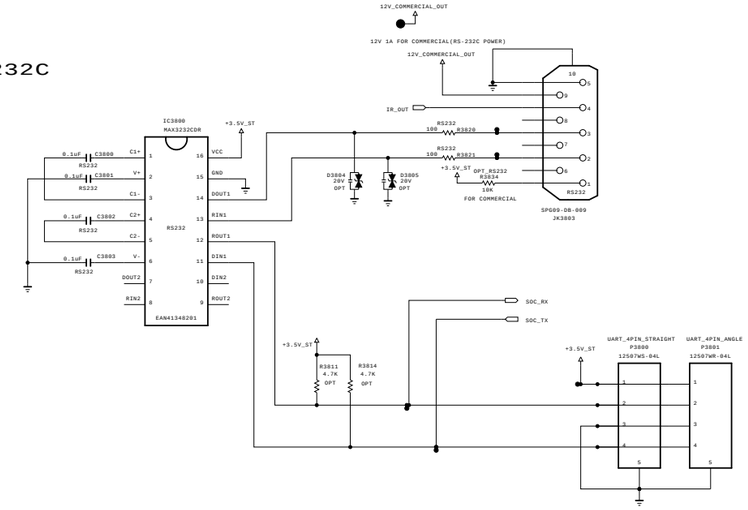
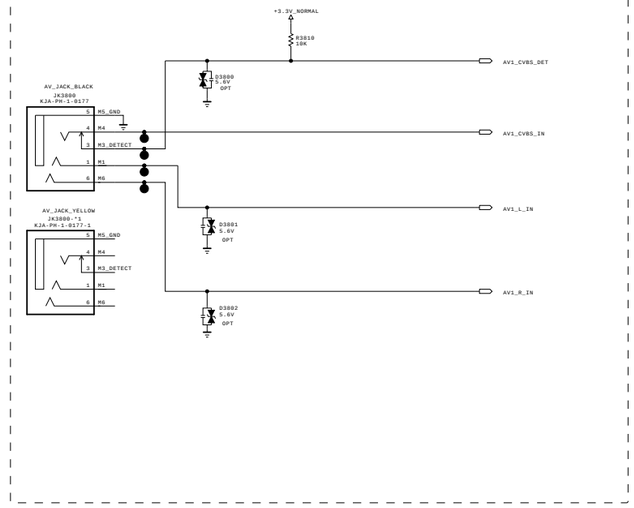
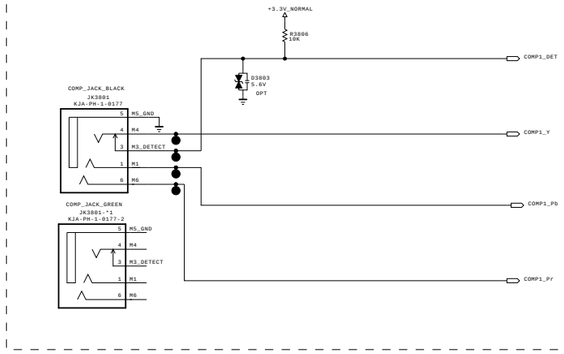
## RS232C

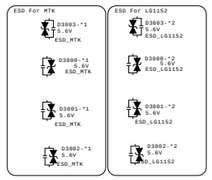



## CVBS 1 PHONE JACK




## COMPONENT 1 PHONE JACK

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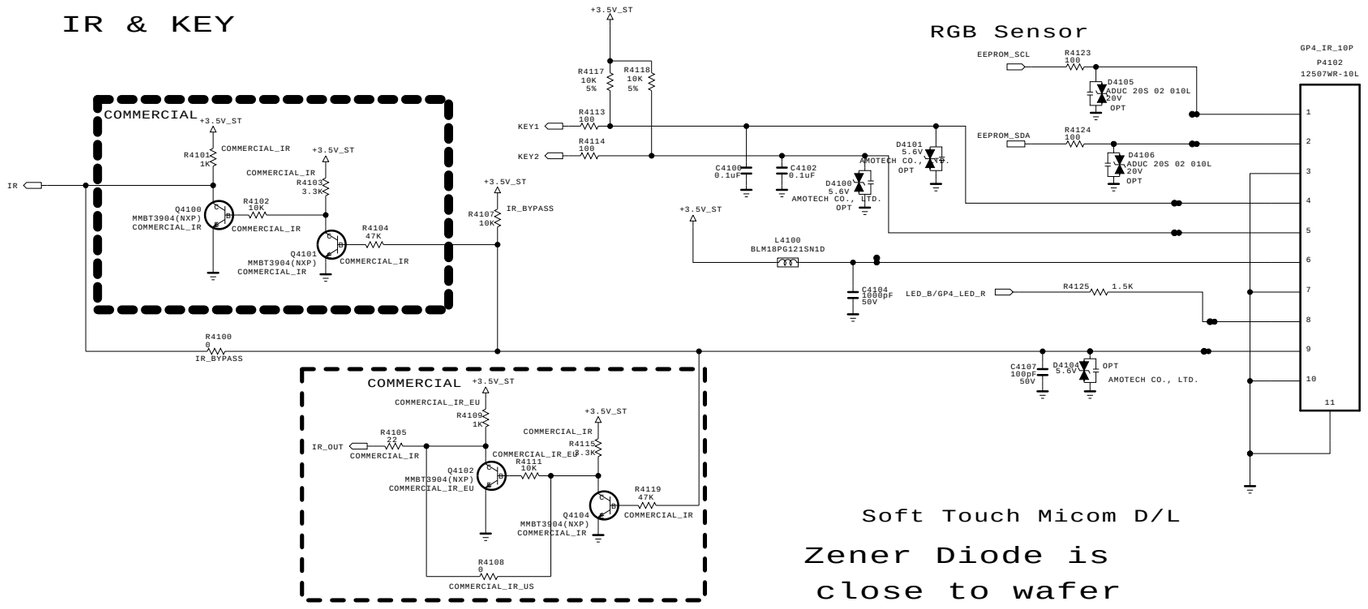
# IR & KEY

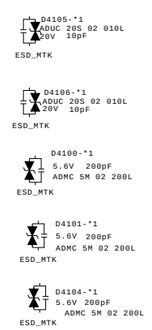



## RGB Sensor

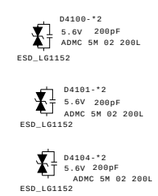
Soft Touch Micom D/L

Zener Diode is close to wafer

## ESD for MTK




## ESD for LG1152

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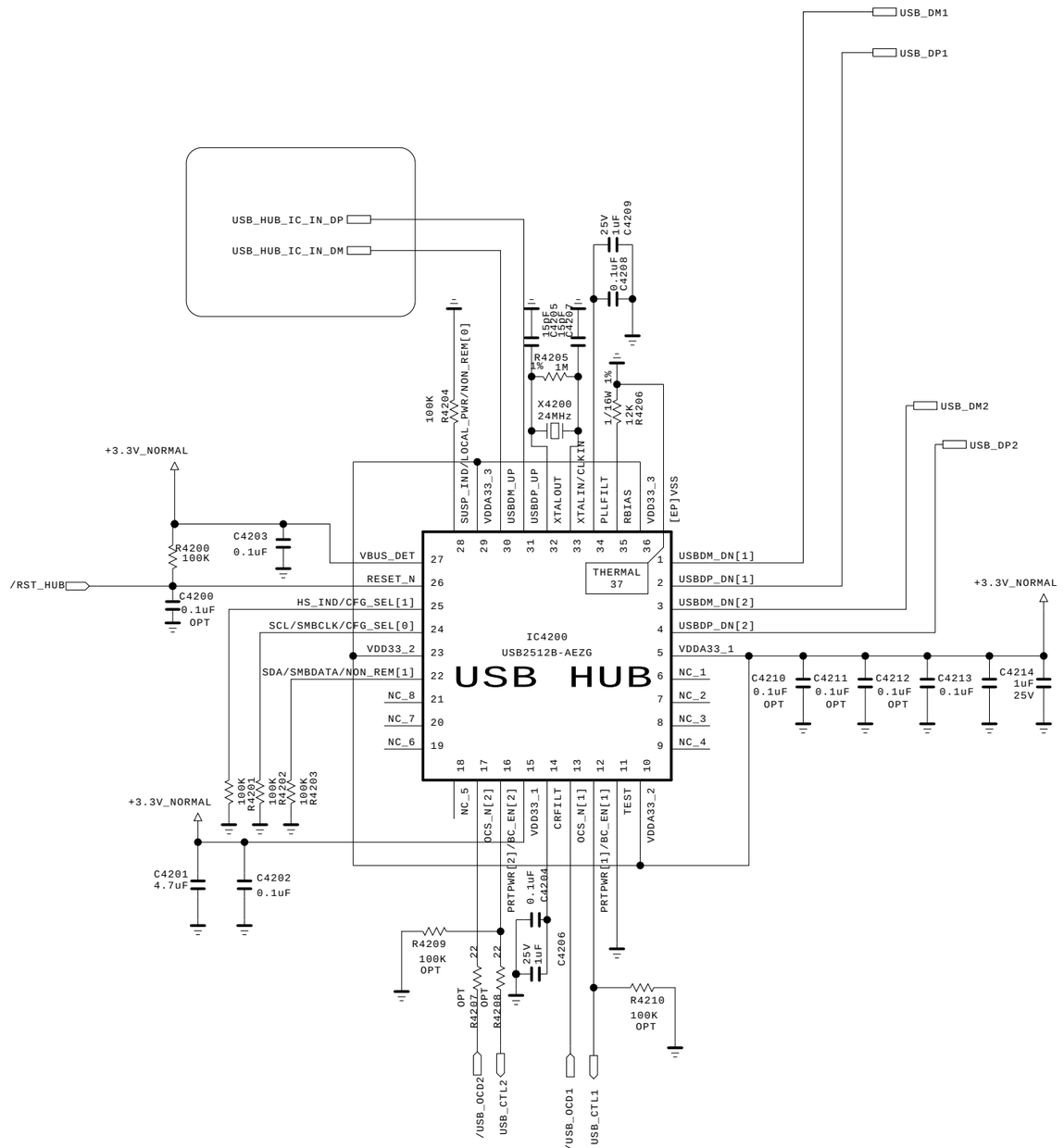


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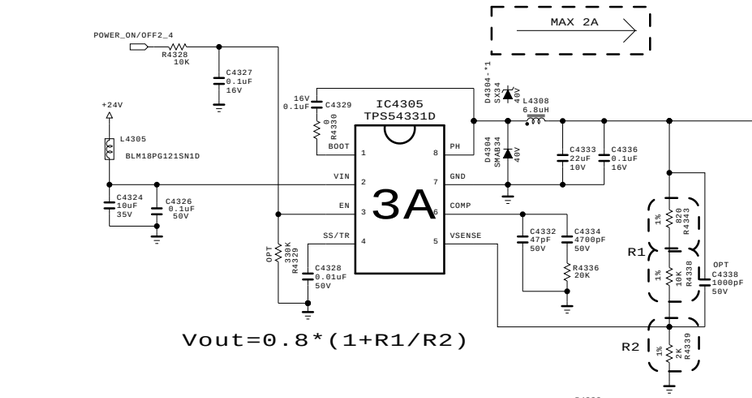
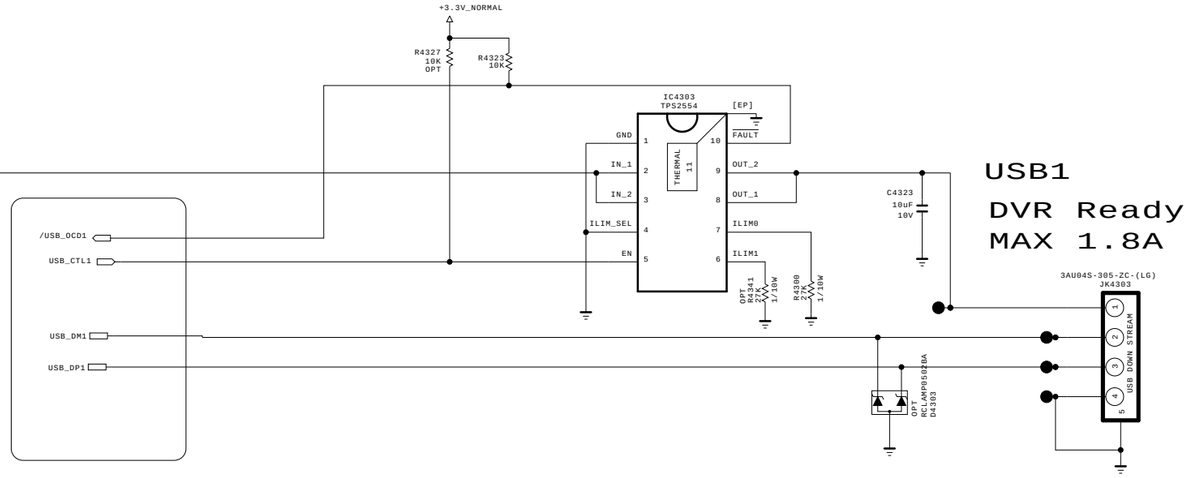
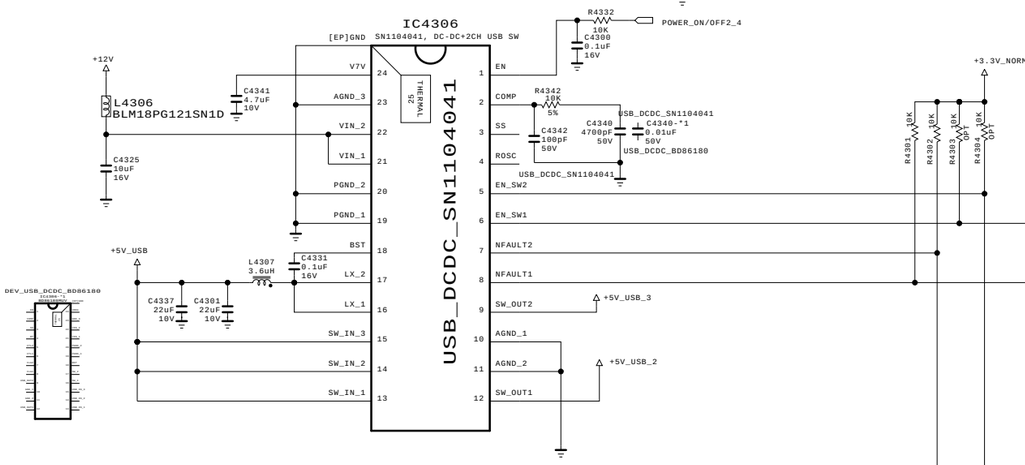
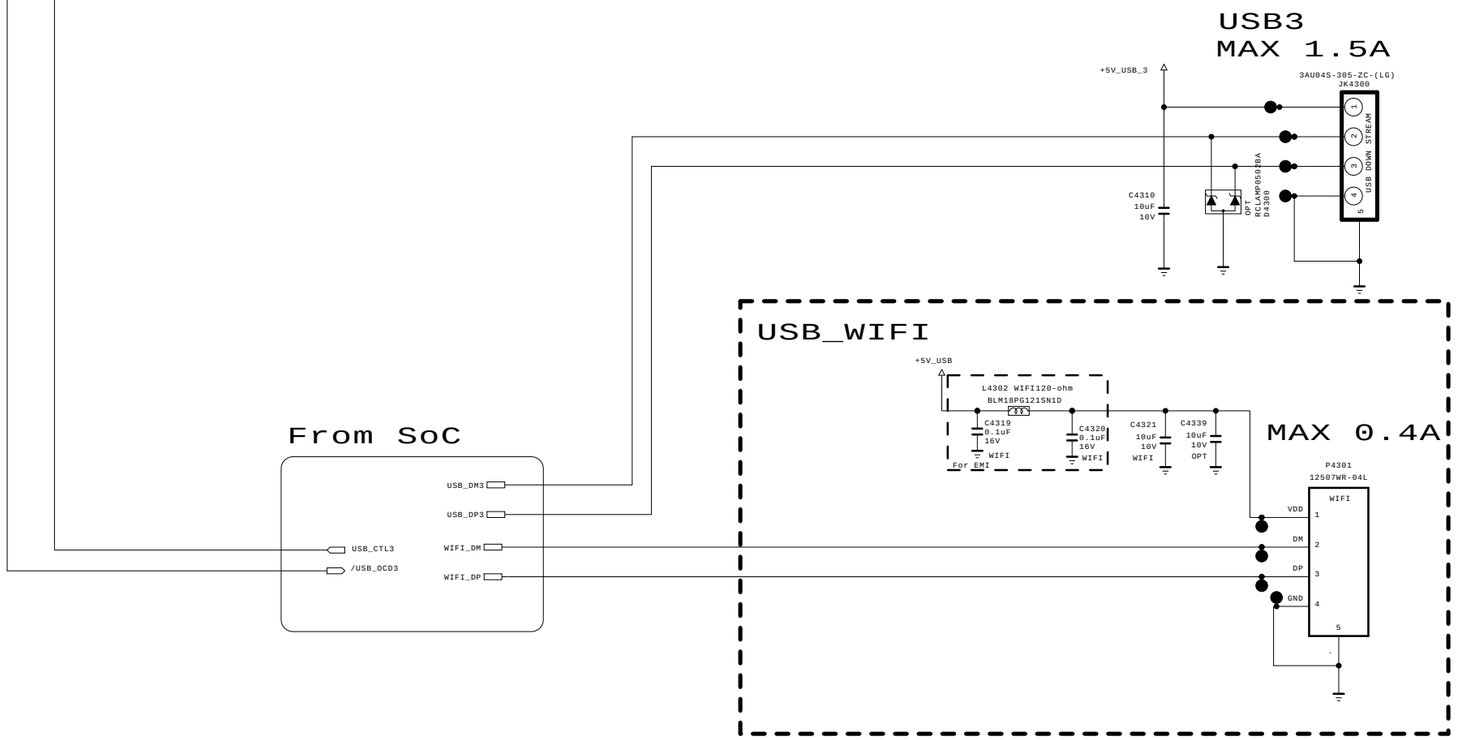
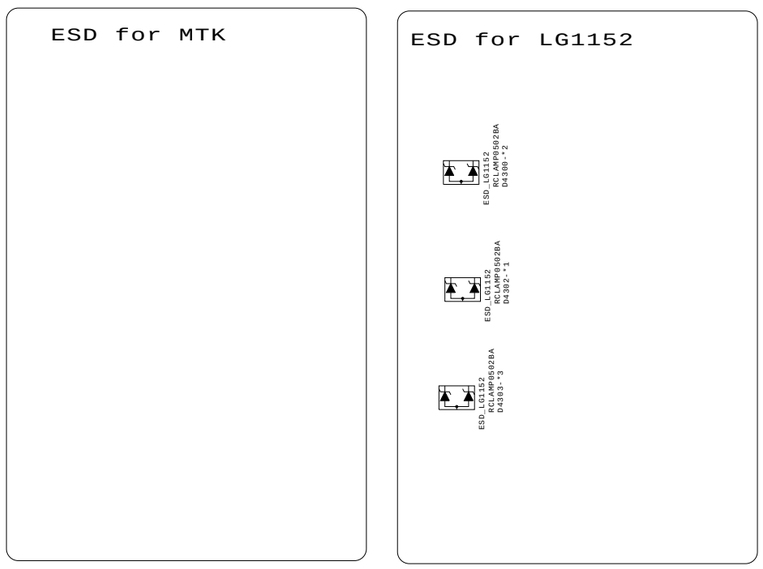
# +5V_USB FOR USB1




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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| MODEL | USB3_HUB_WiFi | DATE | 2011.10.26 |
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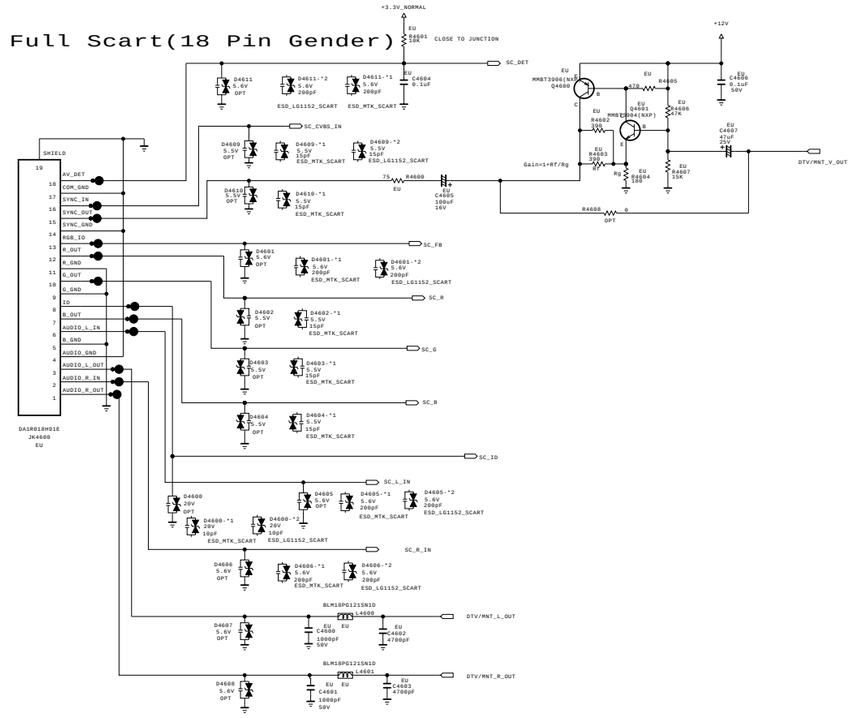
# Full Scart(18 Pin Gender)

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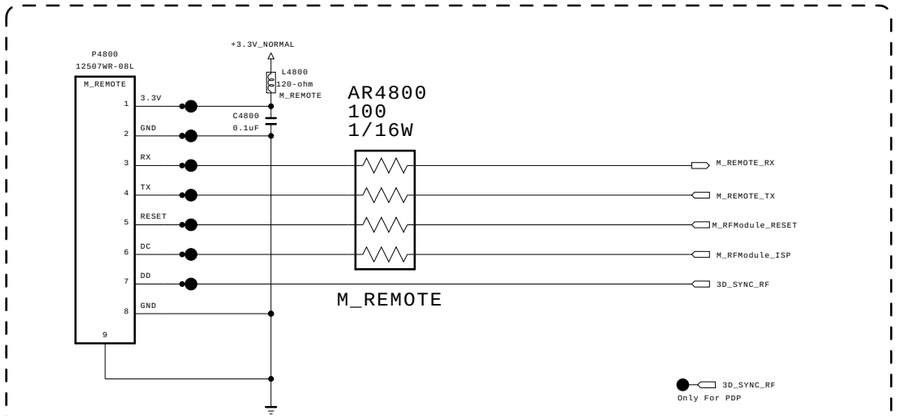
# ZigBee_Radio Pulse M_REMOTE OPTION




ALL M_REMOTE OPTION

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| MODEL | MOTION REMOTE | DATE | 2011.11.21 |
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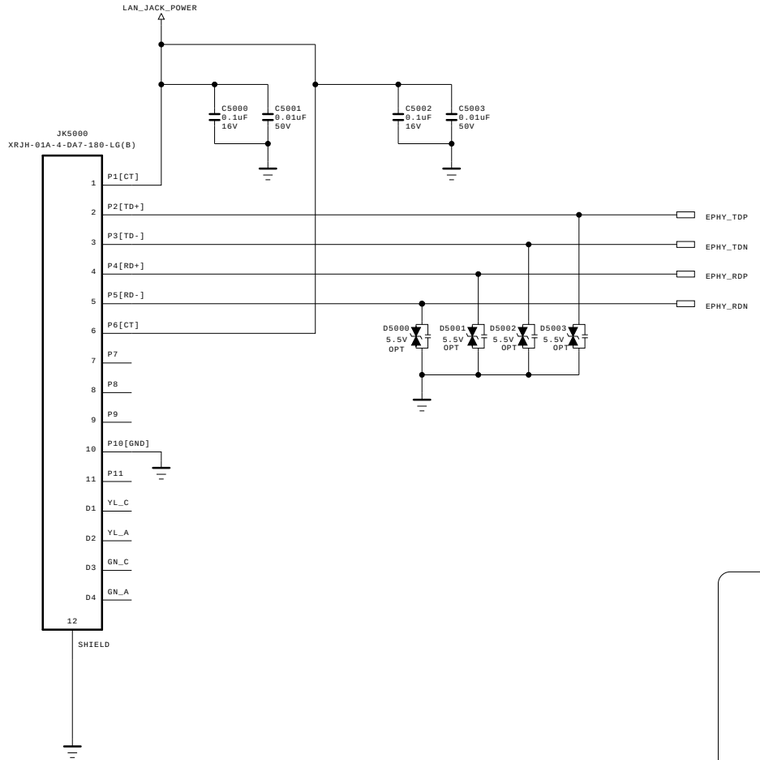
# Ethernet Block




## ESD for MTK

D5000-*1
ESD_MTK
ADUC 5S 02 0R5L

D5001-*1
ESD_MTK
ADUC 5S 02 0R5L

D5002-*1
ESD_MTK
ADUC 5S 02 0R5L

D5003-*1
ESD_MTK
ADUC 5S 02 0R5L

## ESD for LG1152

ESD_LG1152
D5000-*2
5.5V
ADUC 5S 02 0R5L

ESD_LG1152
D5001-*2
5.5V
ADUC 5S 02 0R5L

ESD_LG1152
D5002-*2
5.5V
ADUC 5S 02 0R5L

ESD_LG1152
D5003-*2
5.5V
ADUC 5S 02 0R5L

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| MODEL | LAN_VERTICAL | DATE | 2011.11.23 |
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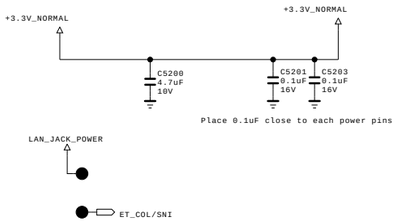
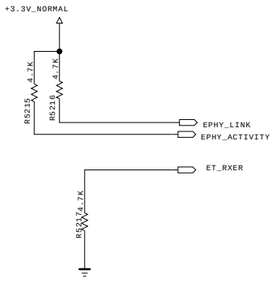
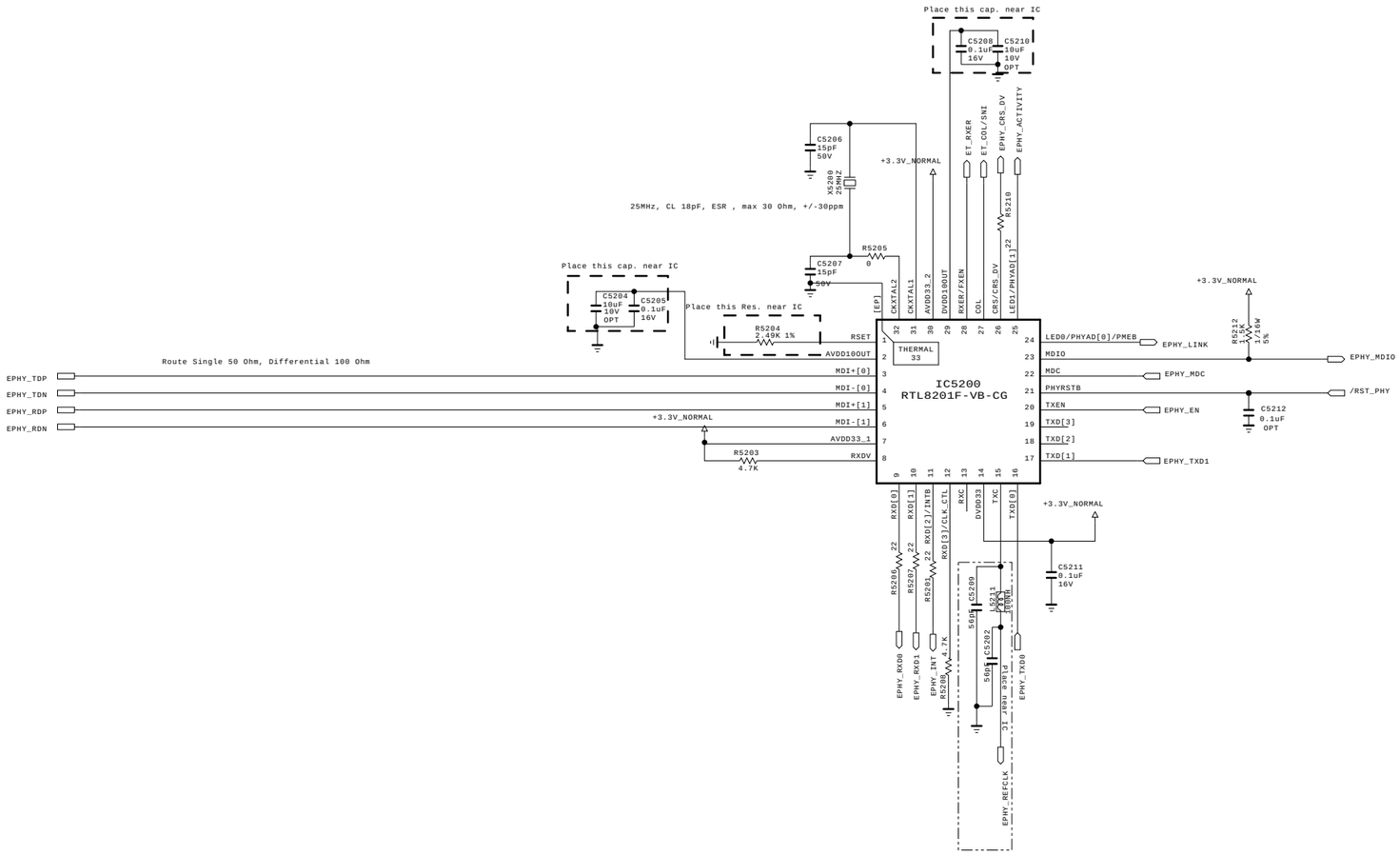
# Ethernet Block

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| MODEL | LG1152 A0 | DATE | |
|---|---|---|---|
| BLOCK | ETHERNET | SHEET | 14 / 50 |

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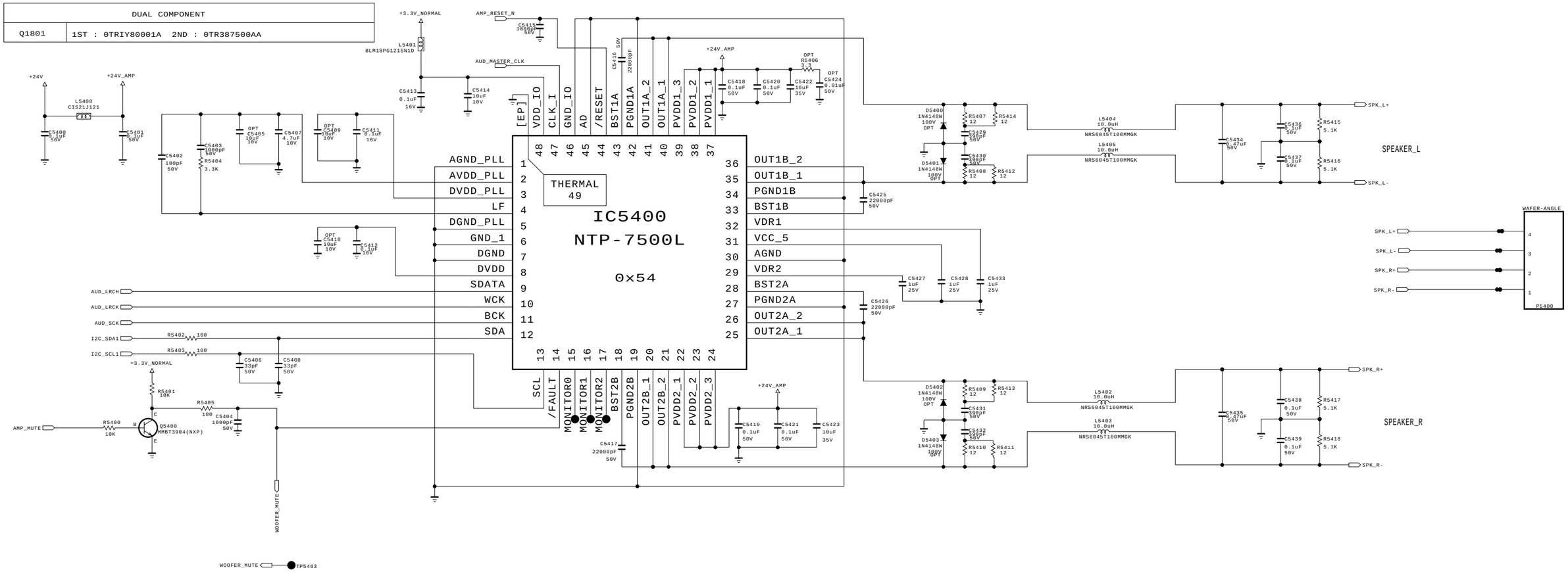
| DUAL COMPONENT | |
|---|---|
| Q1801 | 1ST : 0TRIY80001A 2ND : 0TR387500AA |




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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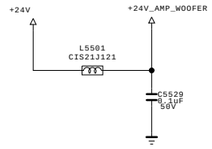
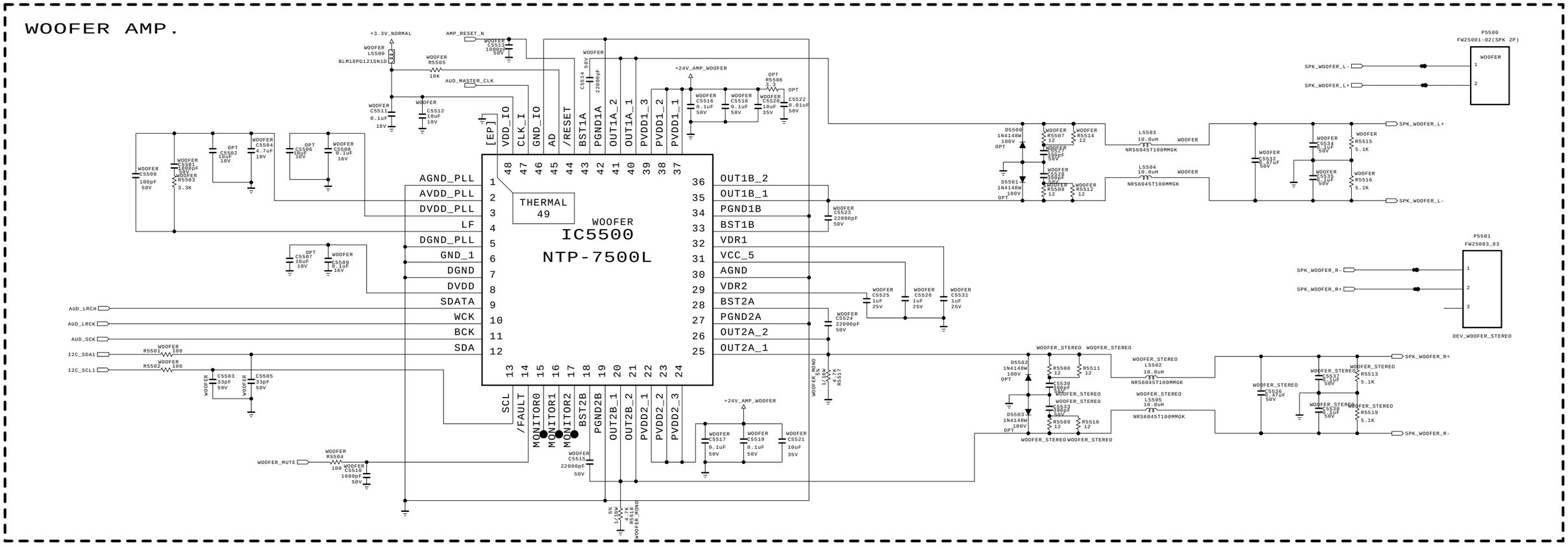



## WOOFER AMP.

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| MODEL | | DATE | |
|---|---|---|---|
| BLOCK | | SHEET | / |

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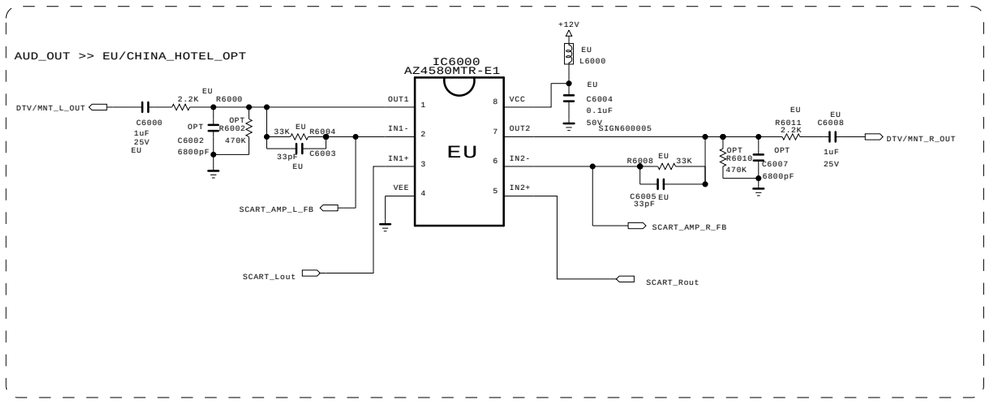


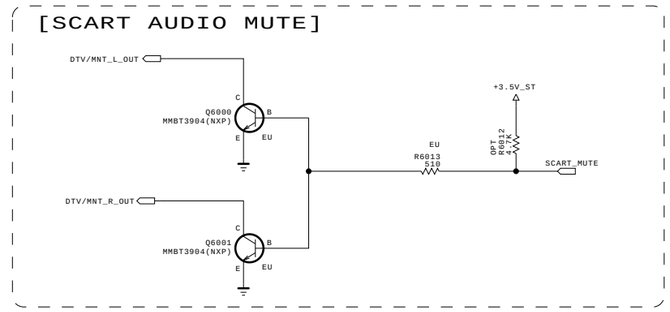


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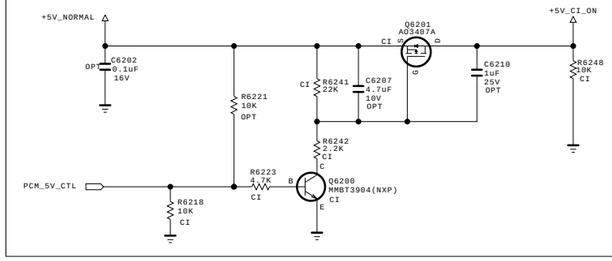
## CI POWER ENABLE CONTROL




### Option FOR MTK

C6210-*1
1uF
25V
CI_MTK

### Option FOR LG1152

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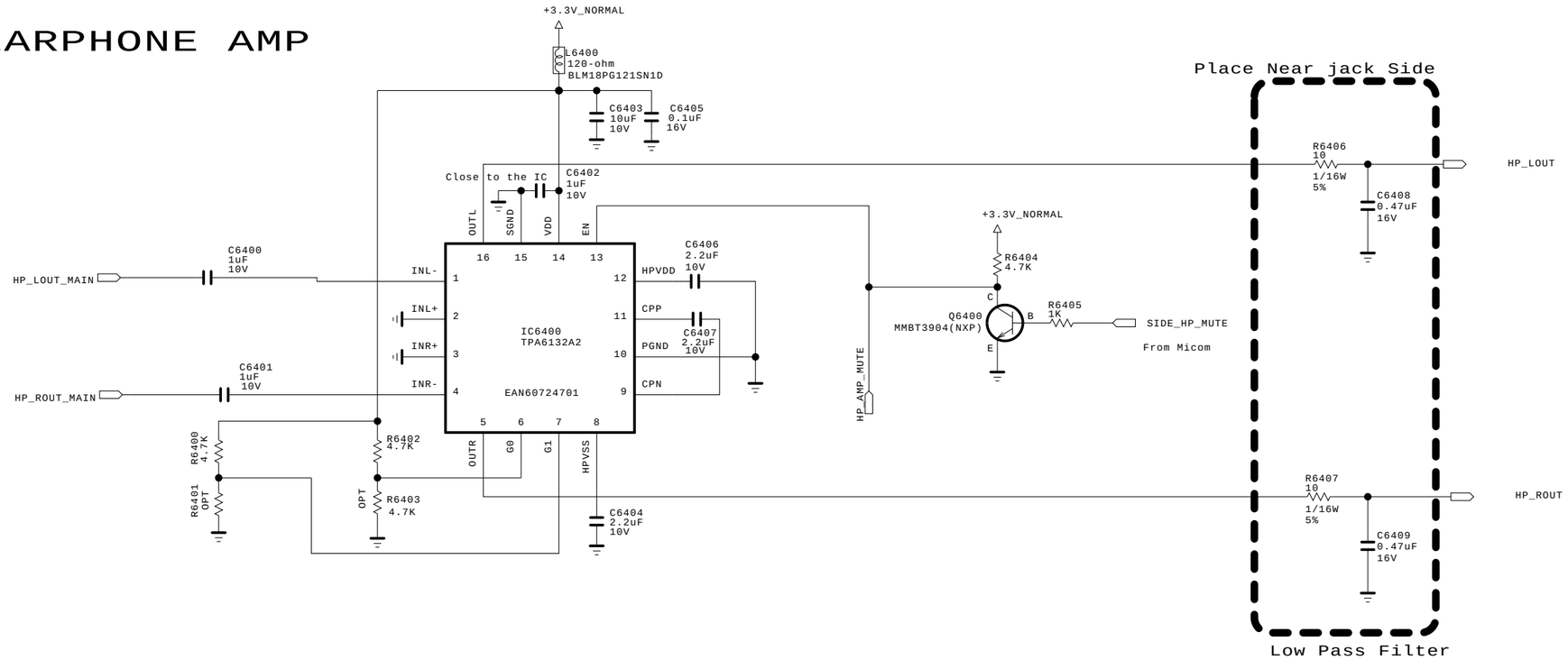
# EARPHONE AMP




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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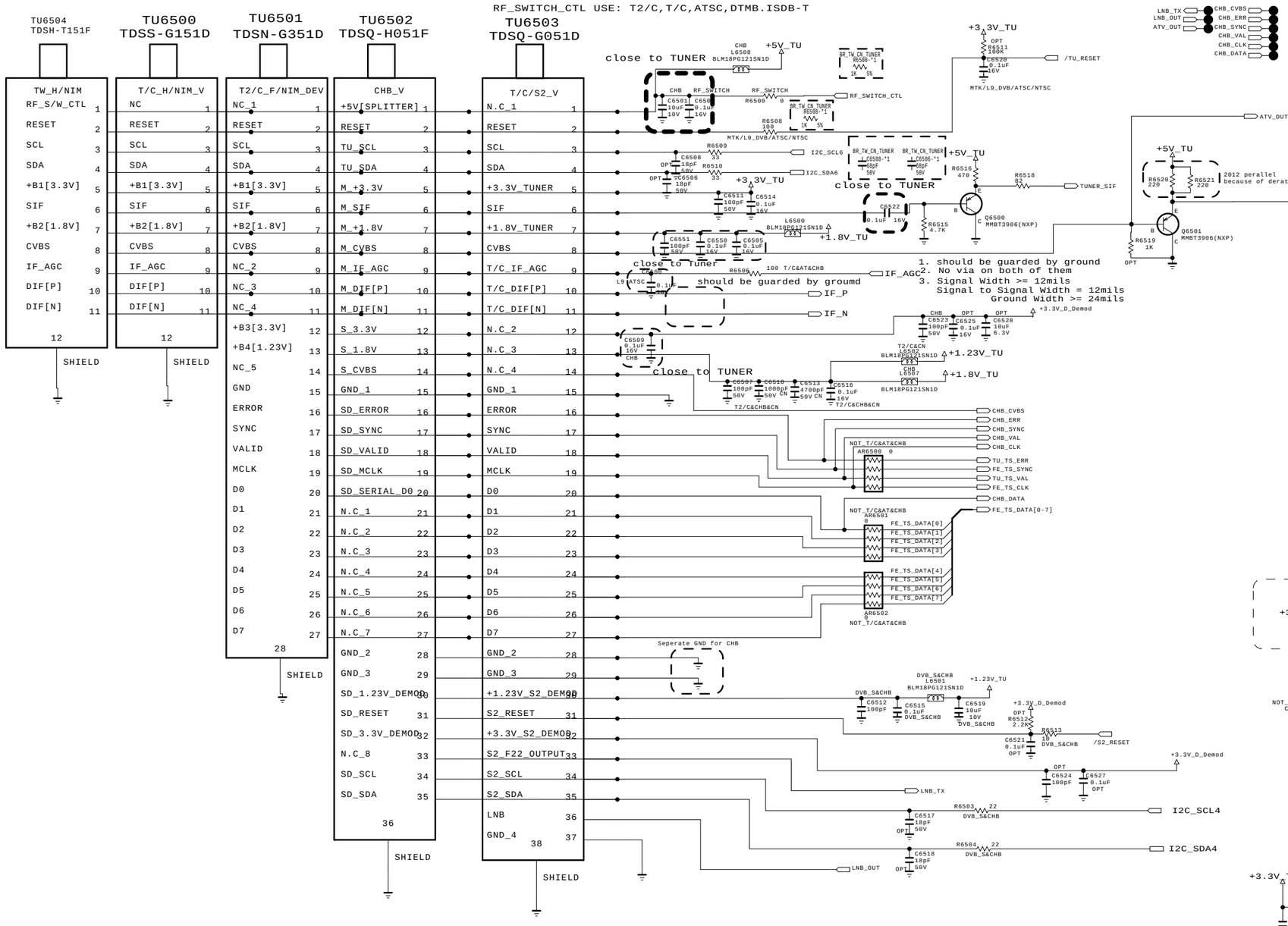
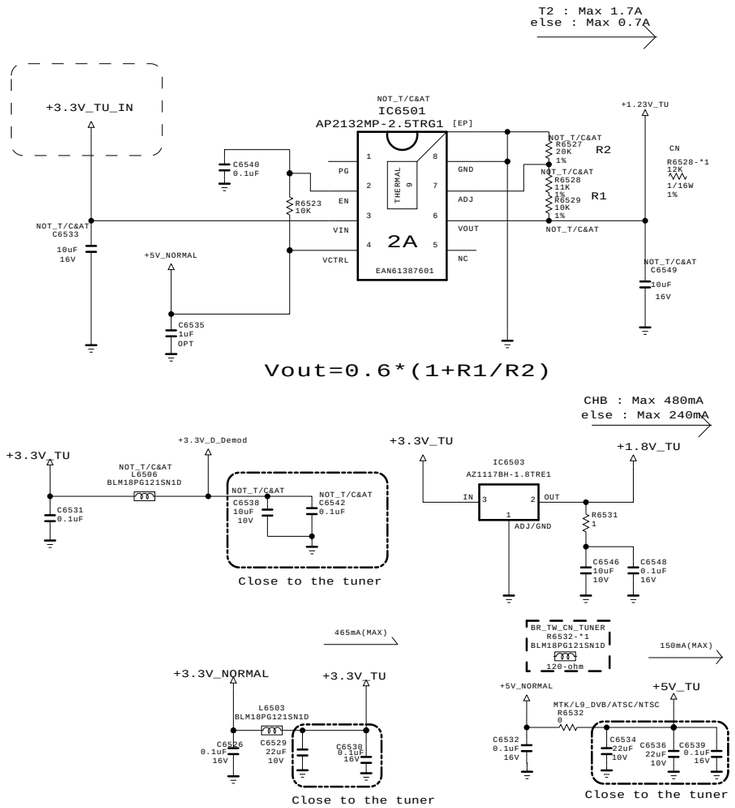
# T/C/S & H/NIM & T2/C TUNER(EU & CHINA)




| T/C_H/NIM | T/C/S2 | T2/C_F/NIM | T2/C/S2 | CHB | AT_H/NIM | CN | BR |
|---|---|---|---|---|---|---|---|
| T/C&AT&CHB | DVB_S | NOT_T/C&AT | DVB_S | CHB | T/C&AT&CHB | CN | |
| NOT_DVB_S | DVB_S&CHB | T2/C | DVB_S&CHB | DVB_S&CHB | NOT_DVB_S | NOT_T/C&AT | |
| Not_L9_T2/C/S | NOT_T/C&AT | T2/C&CN | NOT_T/C&AT | NOT_T/C&AT | Not_L9_T2/C/S | RF_SWITCH | |
| | T/C&AT&CHB | T2/C&CHB&CN | T2/C | T/C&AT&CHB | | NOT_T/C&AT&CHB | |
| | NOT_T/C&AT&CHB | NOT_T/C&AT&CHB | T2/C&CN | T2/C&CHB&CN | | NOT_DVB_S | |
| | Not_L9_T2/C/S | NOT_DVB_S | T2/C&CHB&CN | H/NIM&CHB | | Not_L9_T2/C/S | |
| | | Not_L9_T2/C/S | NOT_T/C&AT&CHB | Not_L9_T2/C/S | | | |
| | | | L9_T2/C/S | | | | |

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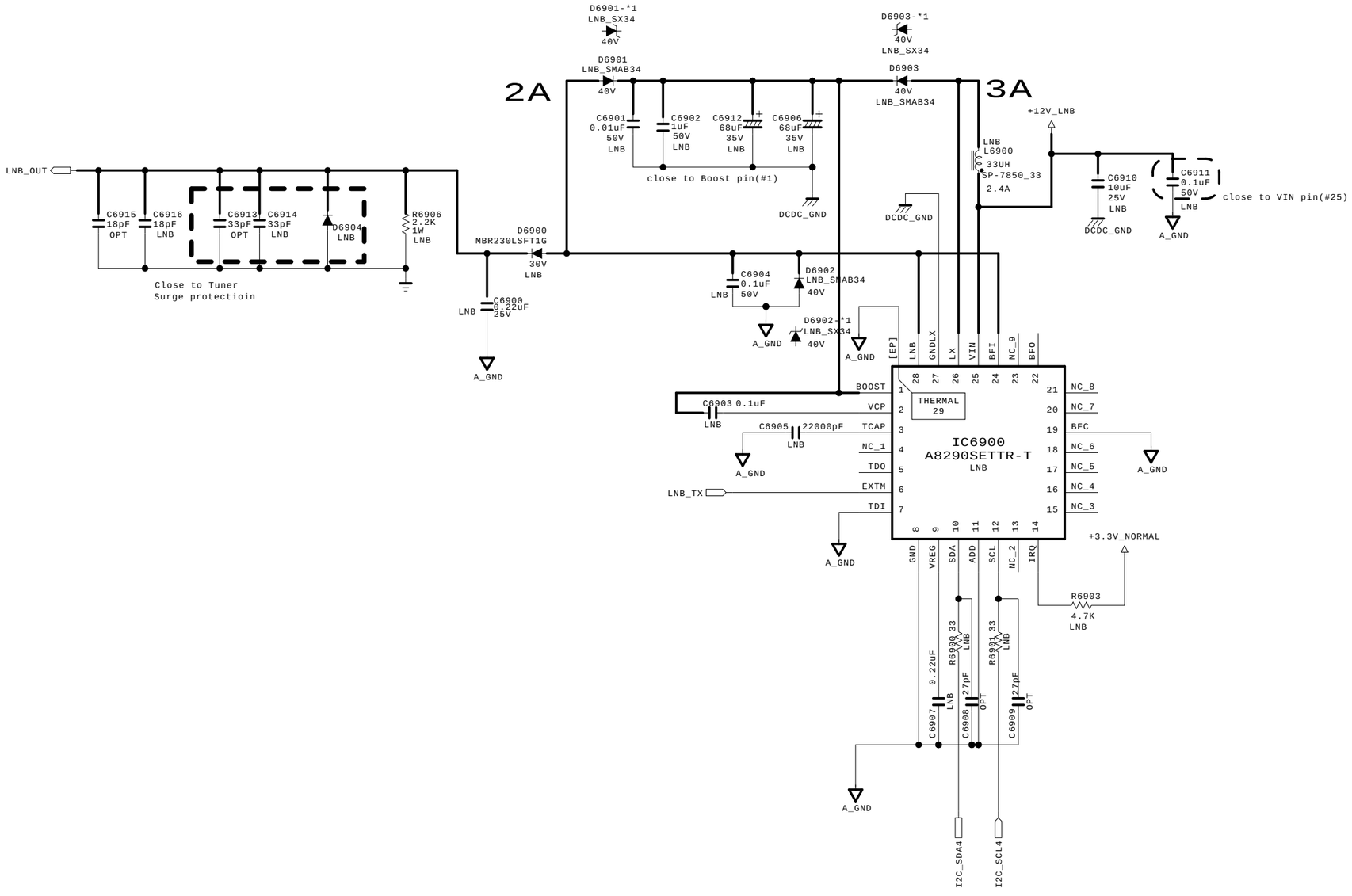
# DVB-S2 LNB Part Allegro

(Option:LNB)

DCDC_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A
Ouput trace widths should be sized to conduct at least 2A

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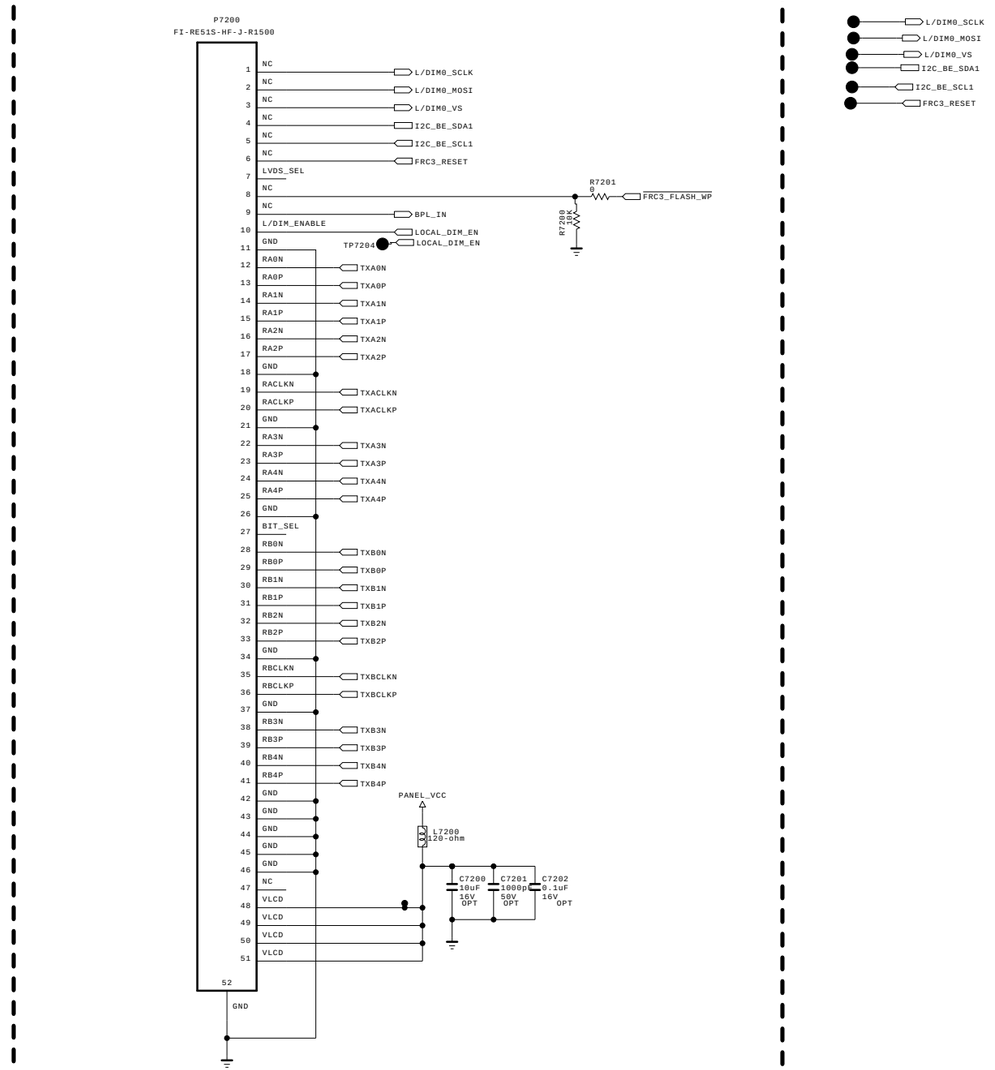
## [51Pin LVDS Connector]
## (For FHD FRC3 HS_LVDS)







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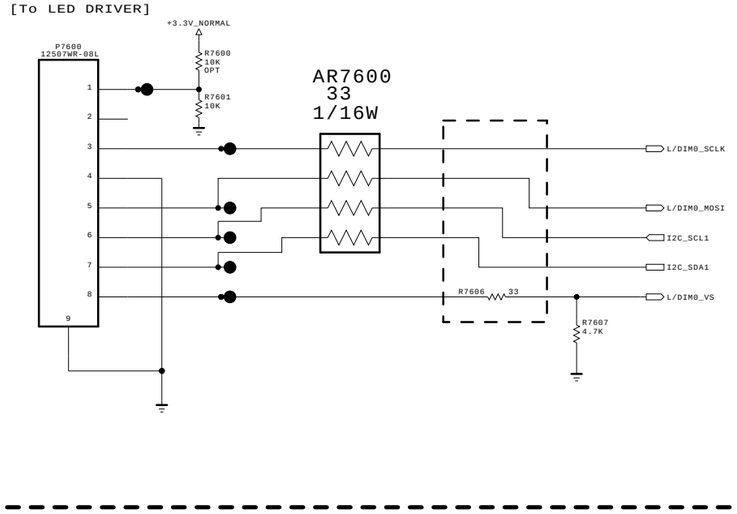
# LOCAL DIMMING

[To LED DRIVER]

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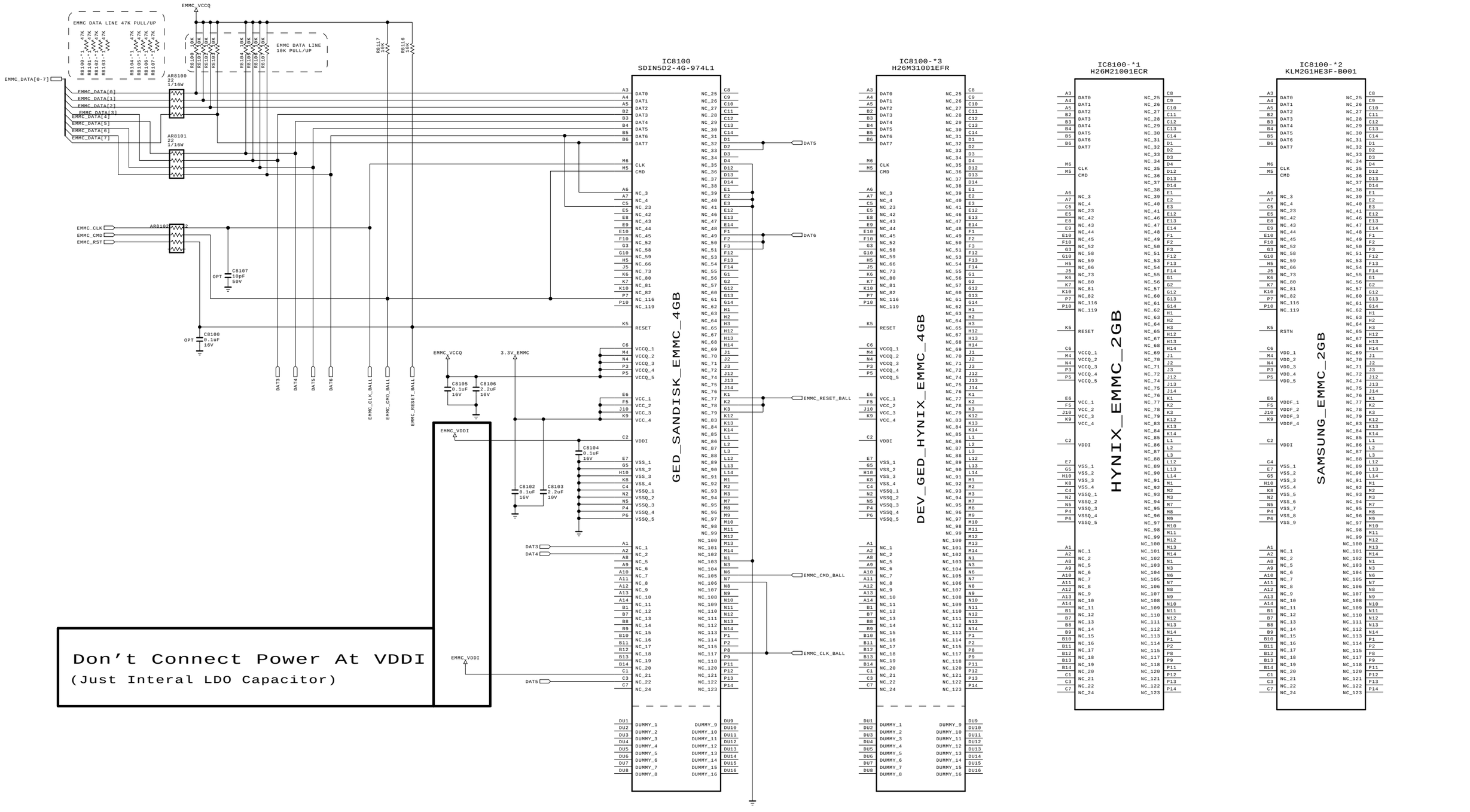
# eMMC I/F




Don’t Connect Power At VDDI
(Just Interal LDO Capacitor)

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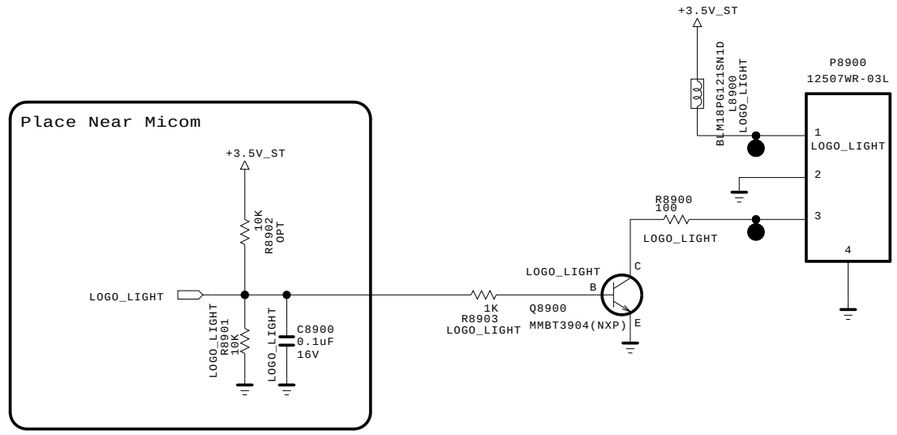


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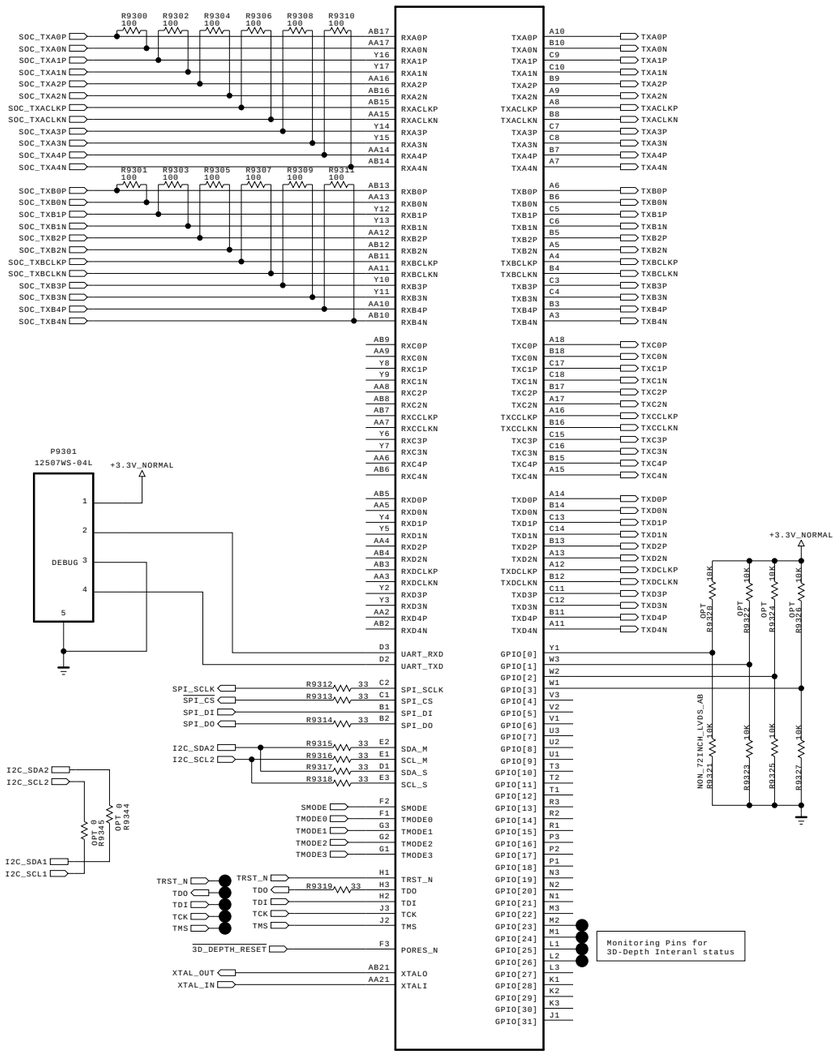


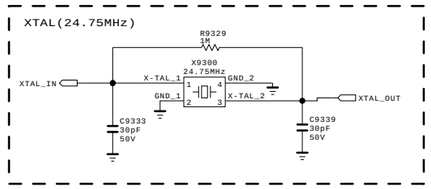


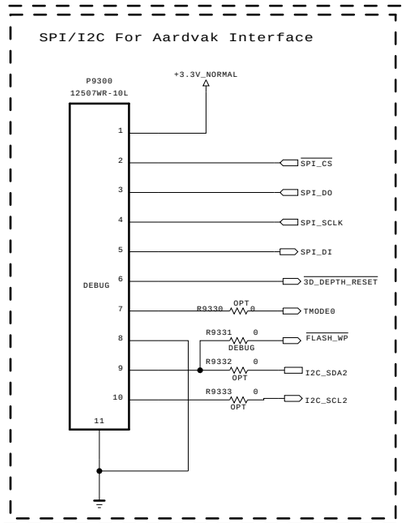


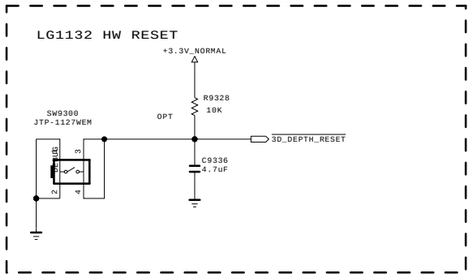


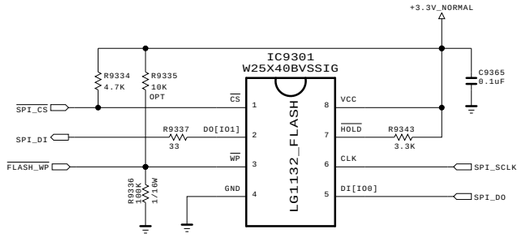


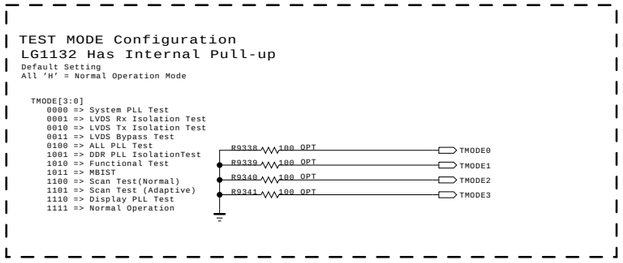


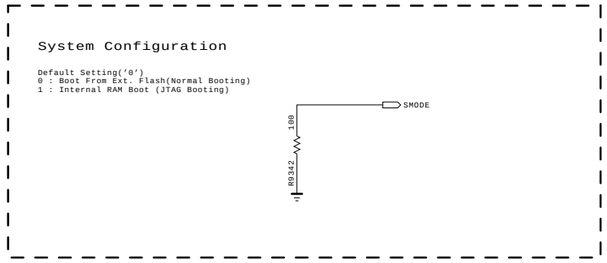


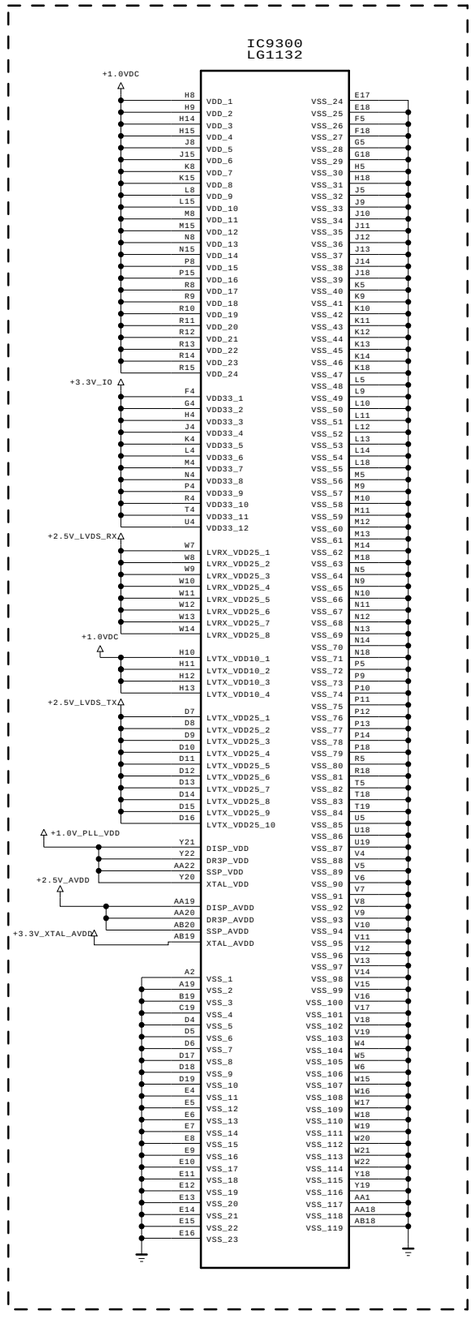


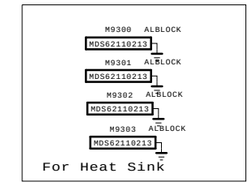


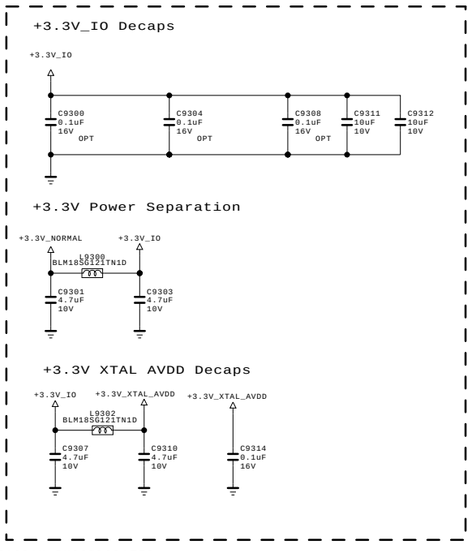


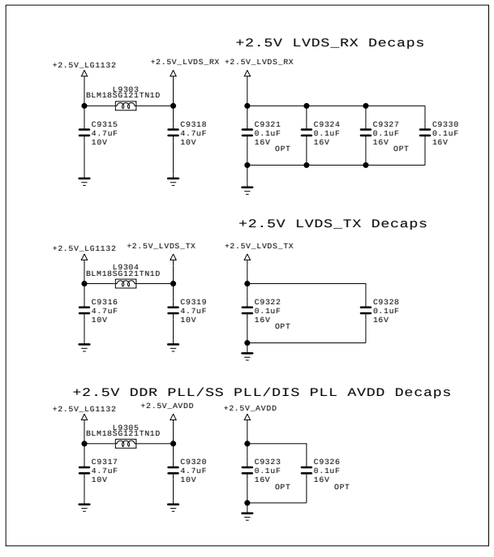


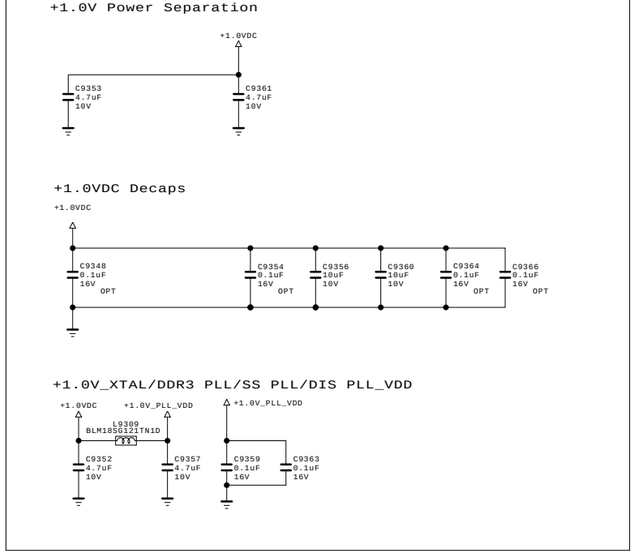


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| MODEL | LG1152 B0 | DATE | 2011. 11. 28 |
| BLOCK | 3D Depth | SHEET | / |

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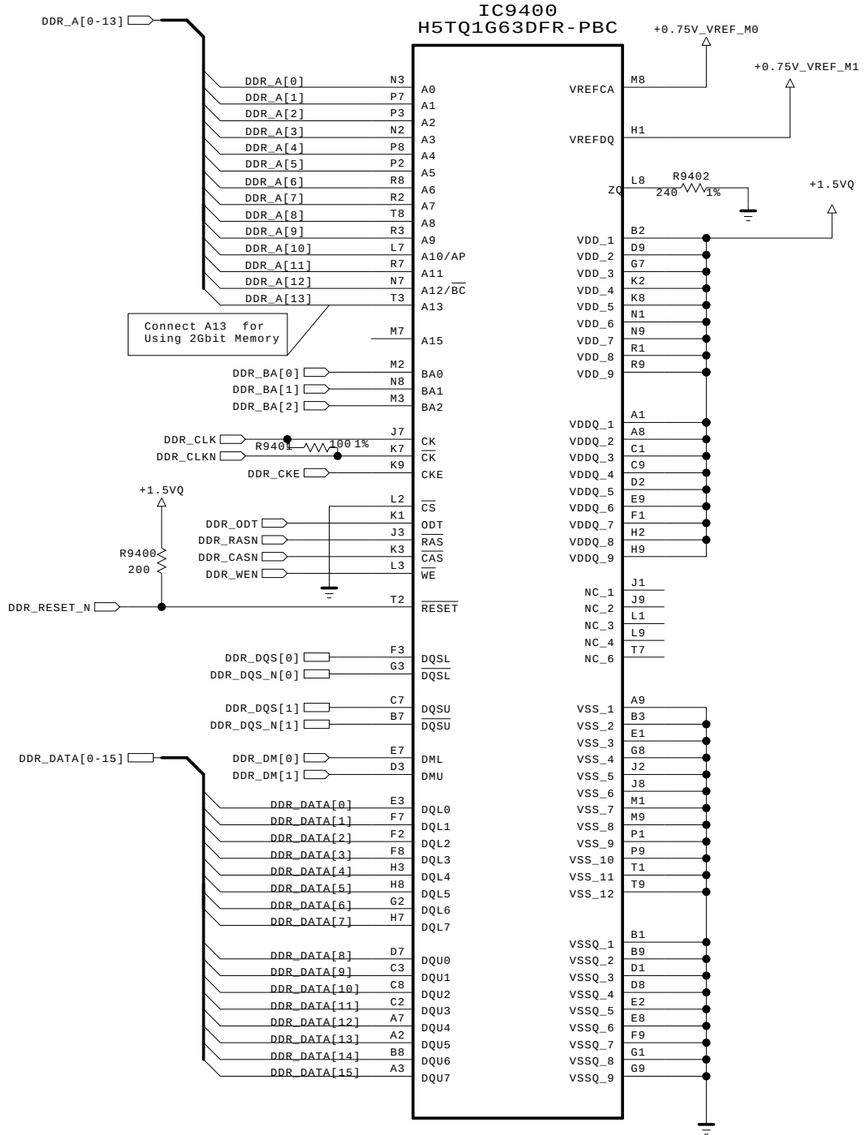
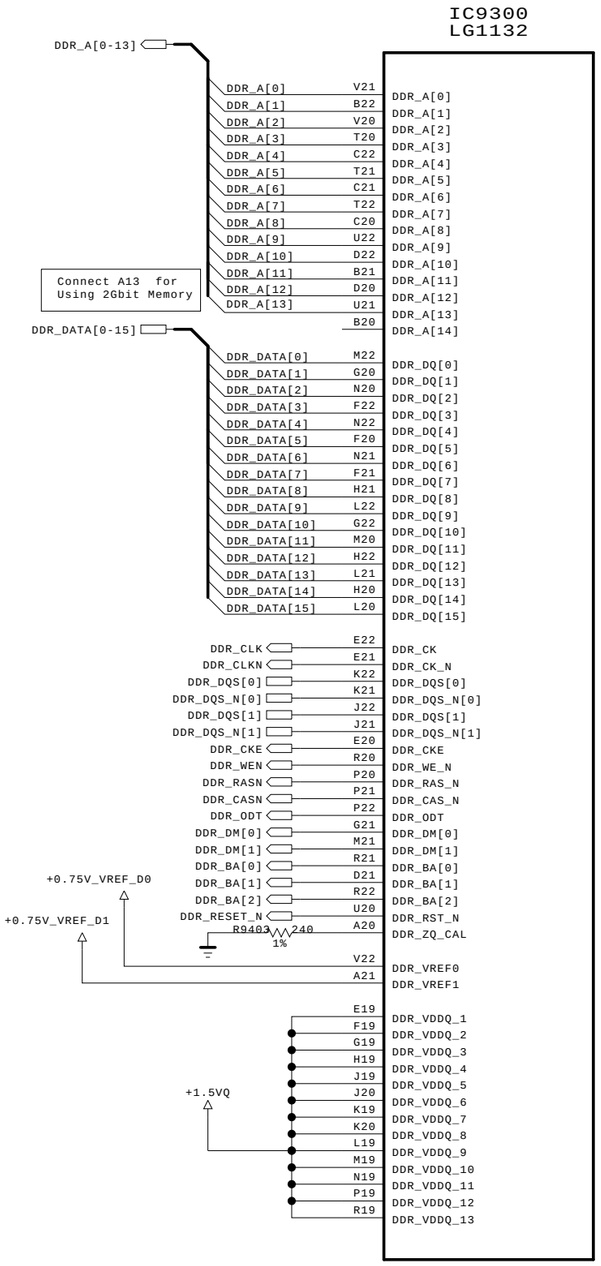
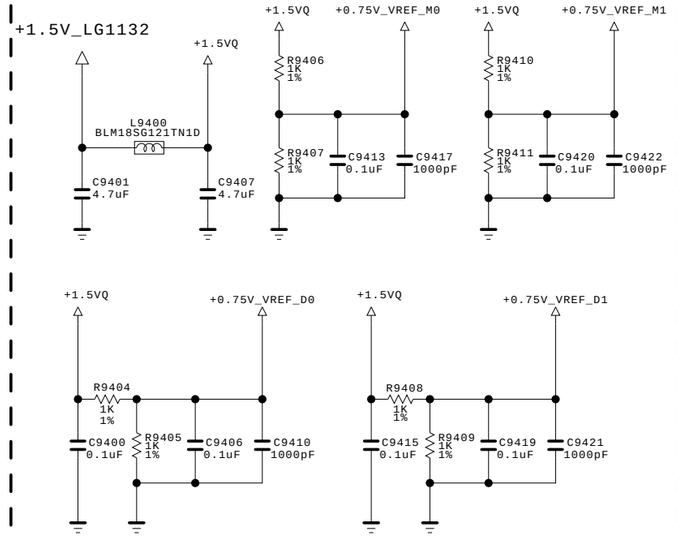
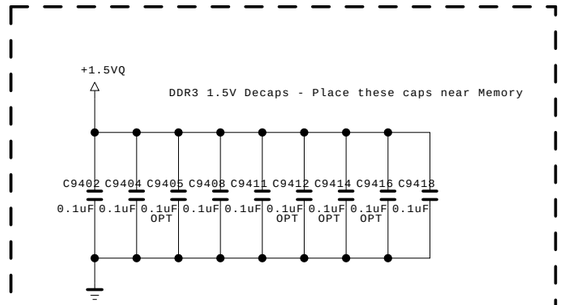
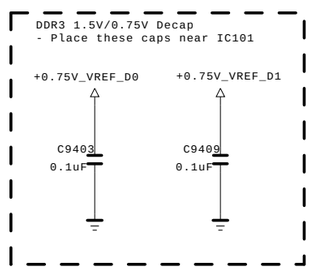



## DDR0 PHY VREF





+1.5VQ
DDR3 1.5V Decaps - Place these caps near Memory
C9402 C9404 C9405 C9408 C9411 C9412 C9414 C9416 C9418
0.1uF 0.1uF 0.1uF OPT 0.1uF 0.1uF 0.1uF OPT 0.1uF OPT 0.1uF OPT 0.1uF

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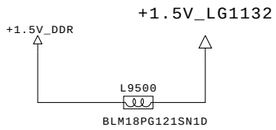
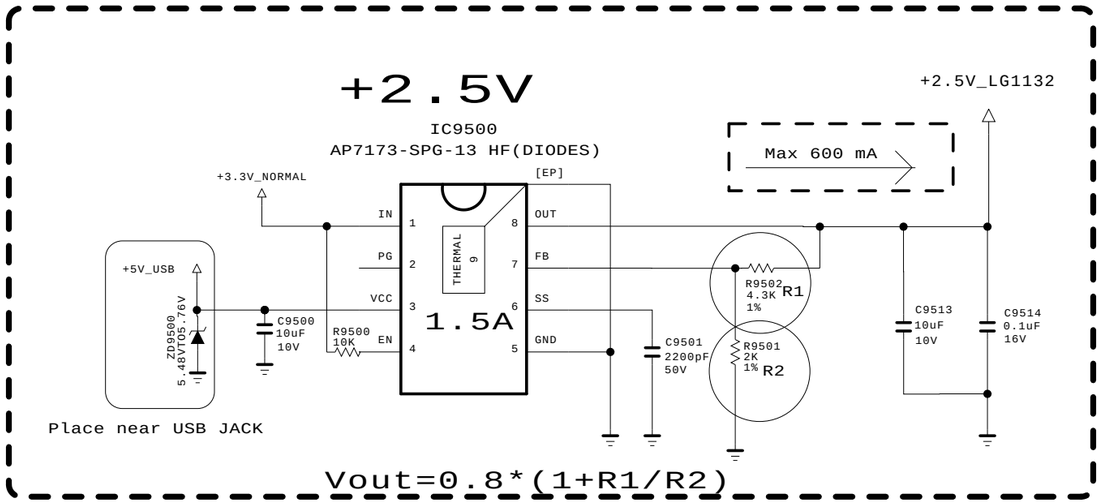
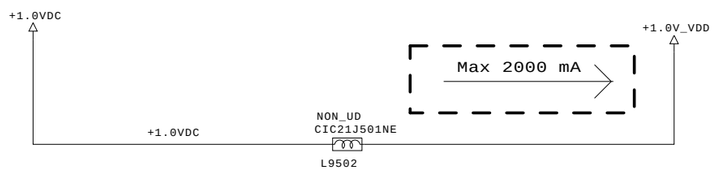



## 3D-Depth Analog for 2.5V




## LG1152 for 1.0V




**NON UD Model

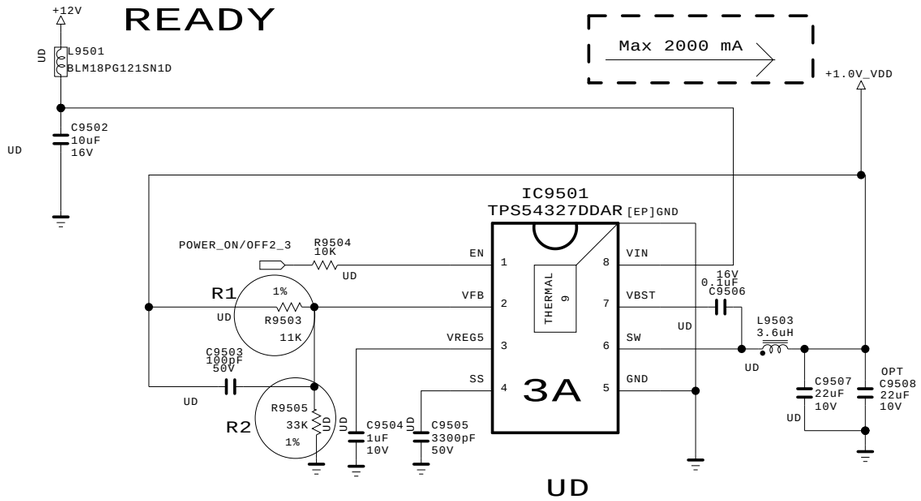
LG1132 DDR = 668Mhz
LG1152 1.0V ==> IC2306
LG1132 1.0V ==> IC2306

**UD Model

LG1132 DDR = 792Mhz
LG1152 1.0V ==> IC2501
LG1132 1.1V ==> IC2306

## L9 CORE for 1.0V
## (UD Model only / LG1132 DDR=792Mh)

READY

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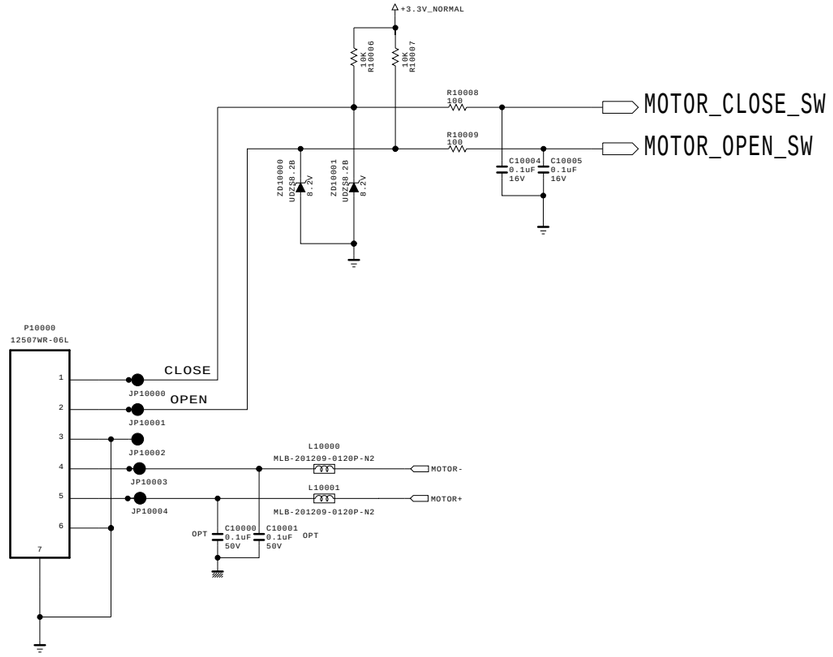
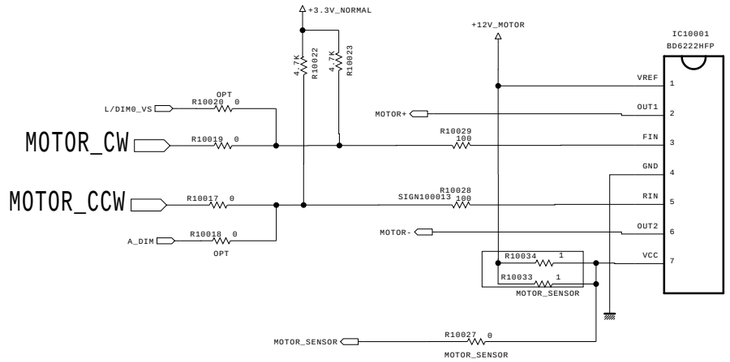
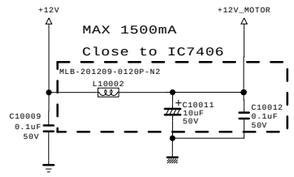
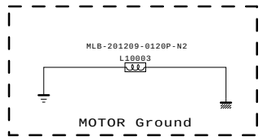
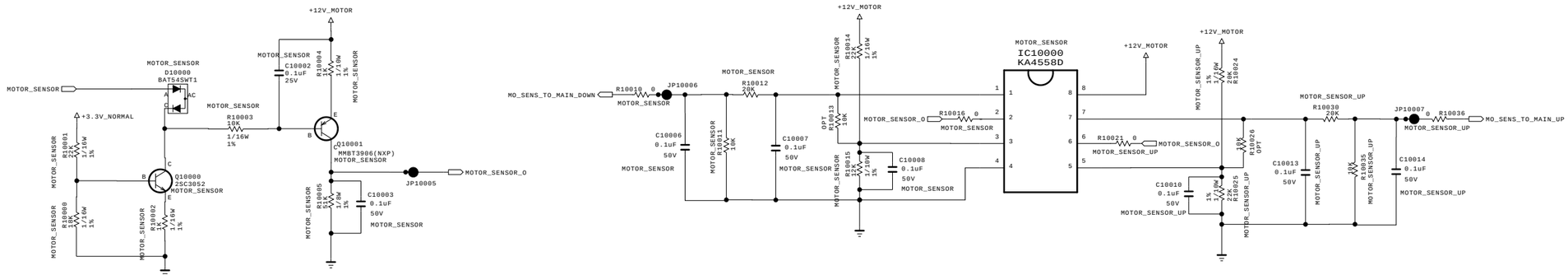



MOTOR DRIVER




MOTOR SENSOR OPTION

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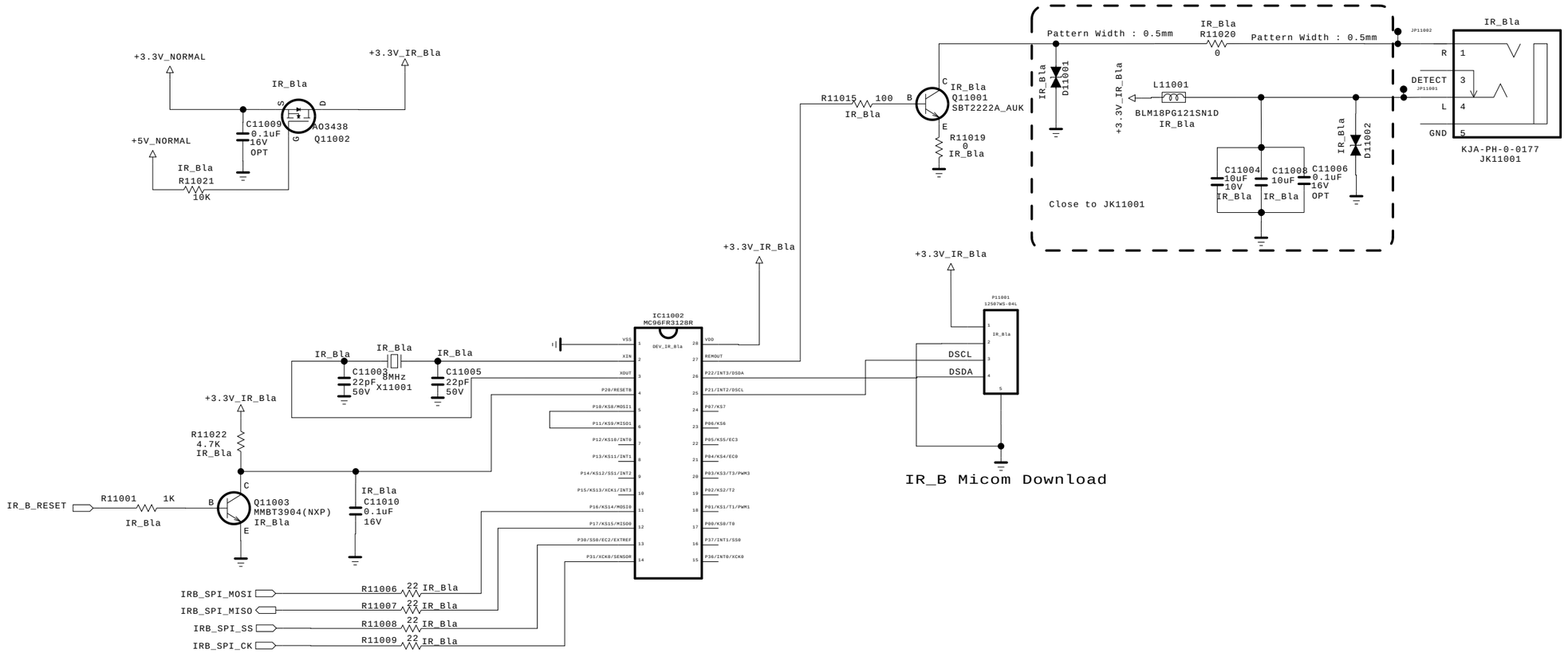
# IR BLASTER




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

LGElectronics

LG ELECTRONICS

| MODEL | LG1152 A1 | DATE | 2011. 06. 02 |
|---|---|---|---|
| BLOCK | IR Blaster/Boost | SHEET | 94 |

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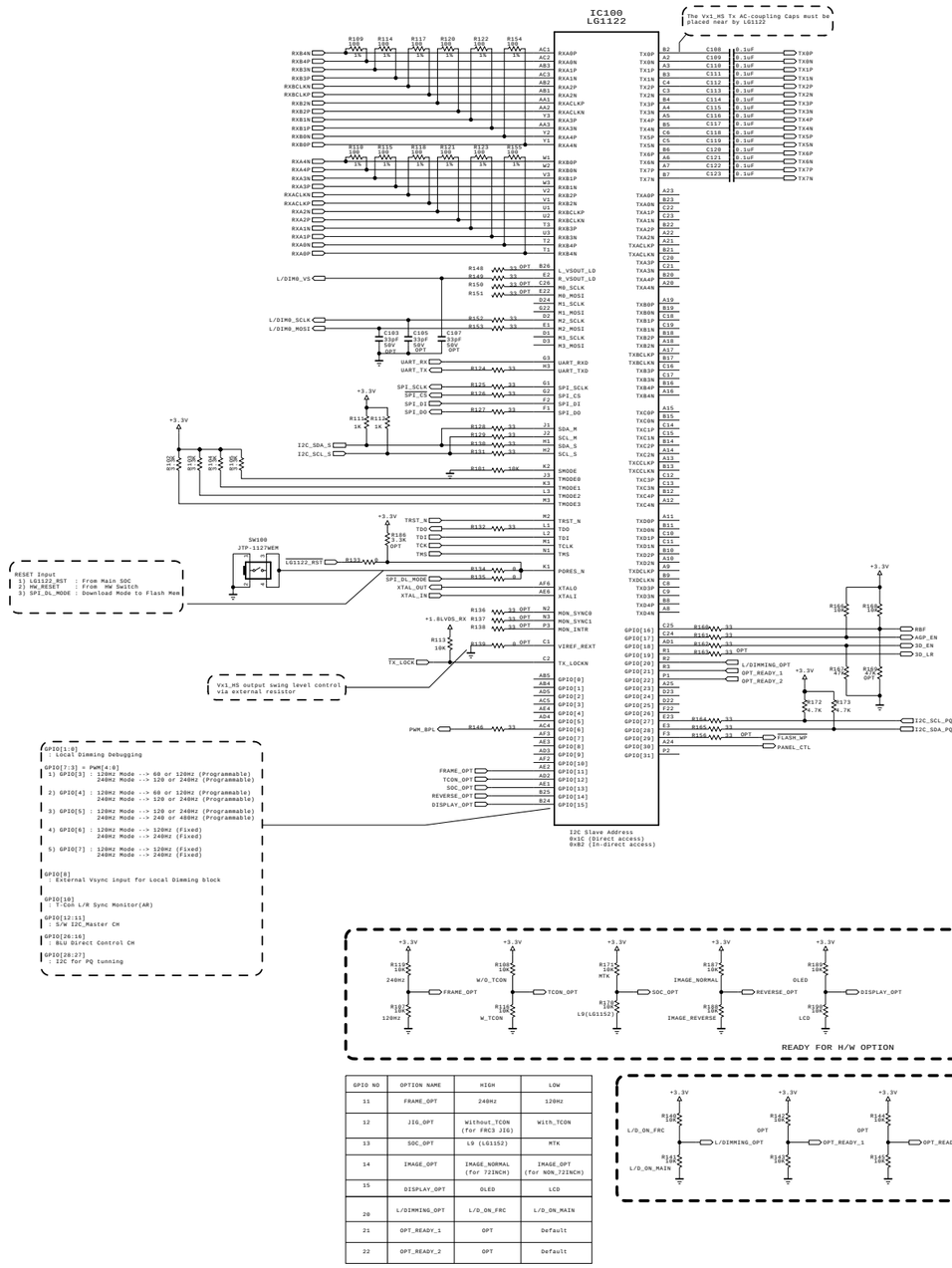
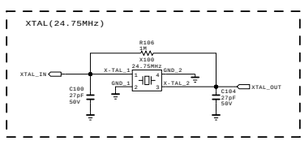


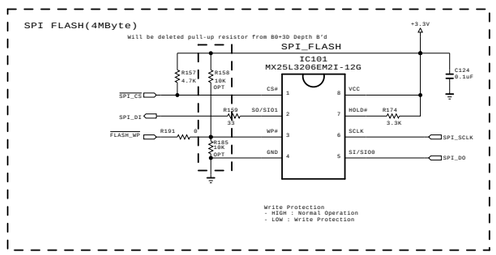


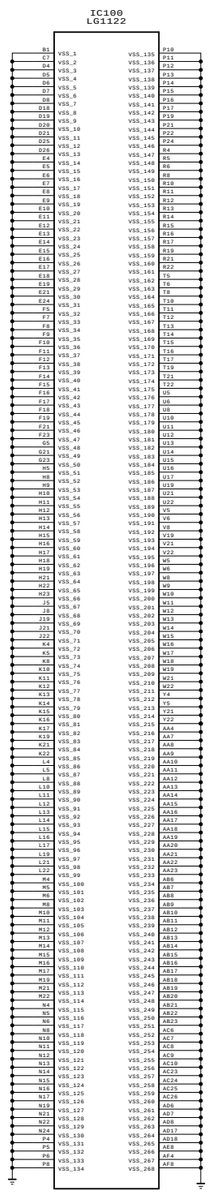


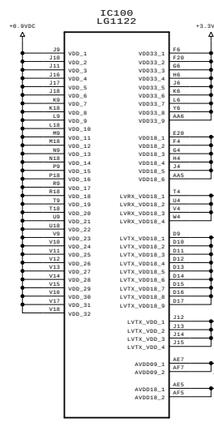
| GPIO NO | OPTION NAME | HIGH | LOW |
|---|---|---|---|
| 11 | FRAME_OPT | 240Hz | 120Hz |
| 12 | JIG_OPT | Without_TCON (for FRC3 JIG) | With_TCON |
| 13 | SOC_OPT | L9 (LG1152) | MTK |
| 14 | IMAGE_OPT | IMAGE_NORMAL (for 721NCH) | IMAGE_OPT (for NON_721NCH) |
| 15 | DISPLAY_OPT | OLED | LCD |
| 20 | L/DIMMING_OPT | L/D_ON_FRC | L/D_ON_MAIN |
| 21 | OPT_READY_1 | OPT | Default |
| 22 | OPT_READY_2 | OPT | Default |



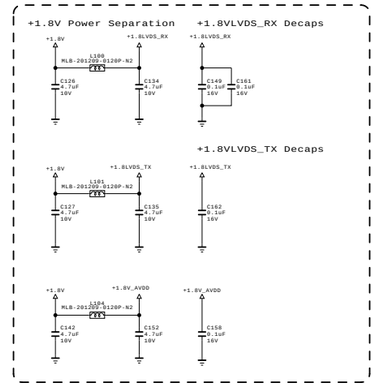



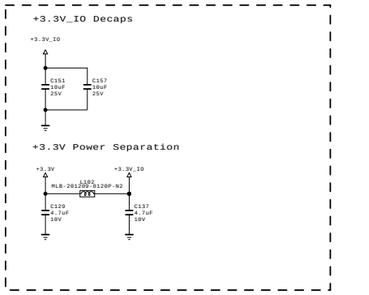



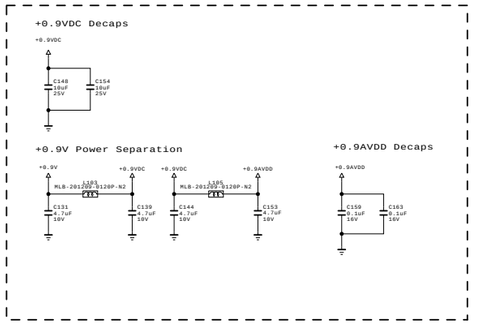



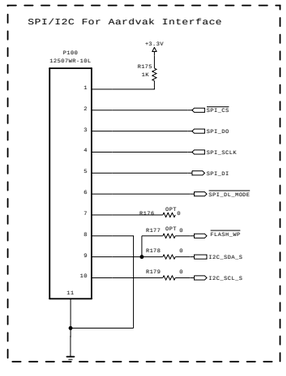



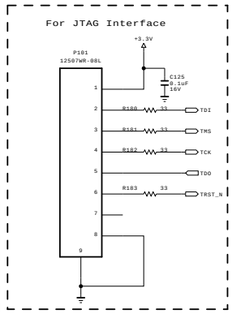

All of OPT decaps must be placed on PCB Bottom side

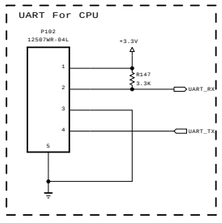


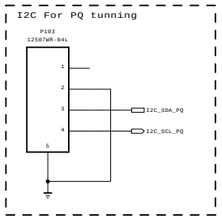

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SECRET
LGElectronics

LG ELECTRONICS

| | | | |
|---|---|---|---|
| MODEL | 240Hz Back-End Board | DATE | 2011. 07. 05 |
| BLOCK | FRC-III(LG1122) | SHEET | 1 / 6 |

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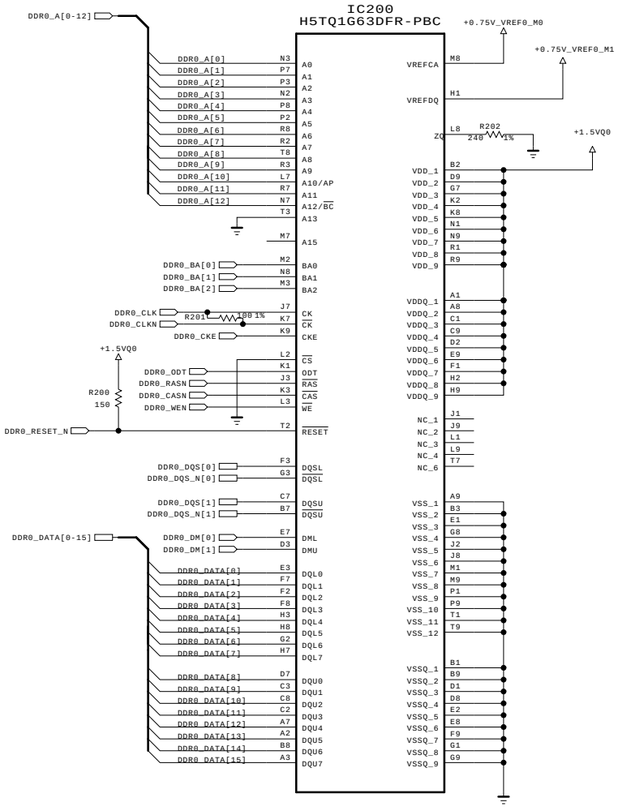


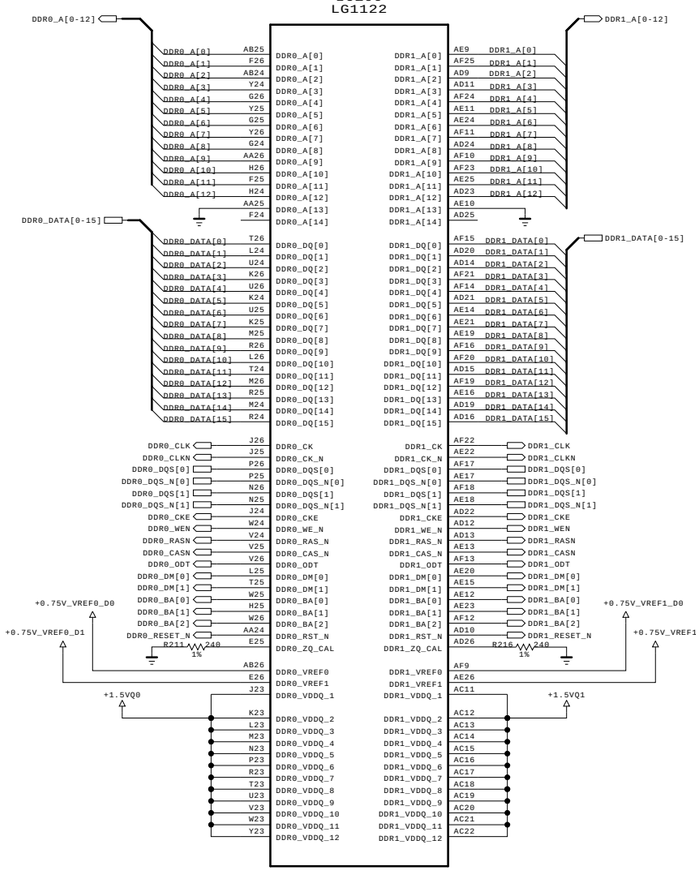


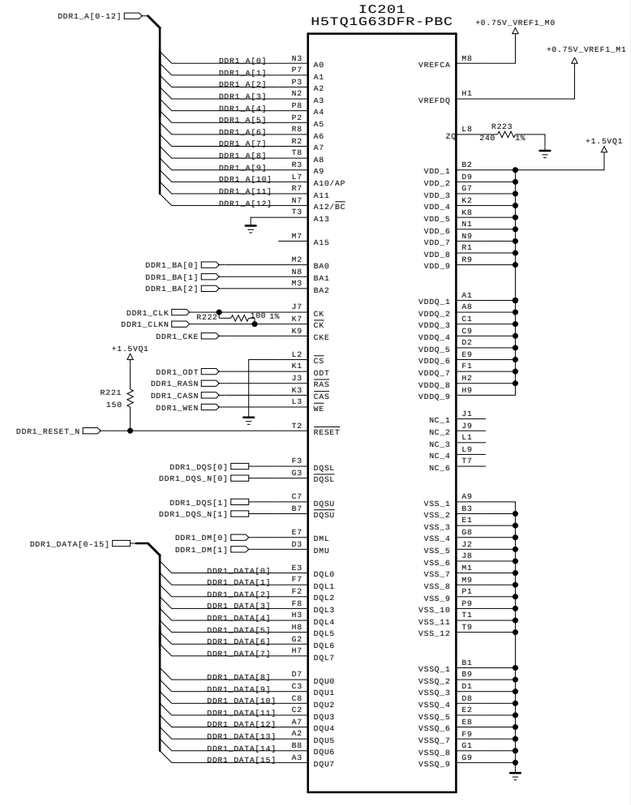


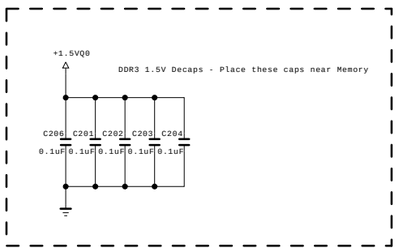


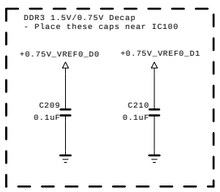


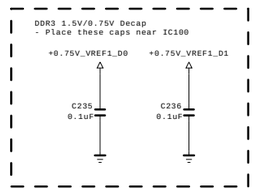


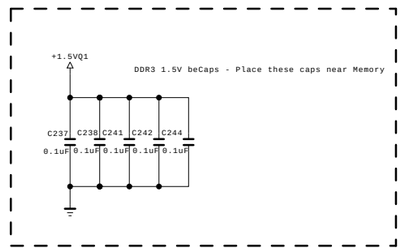


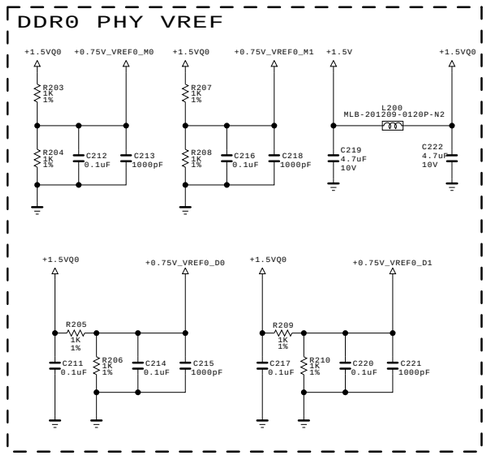


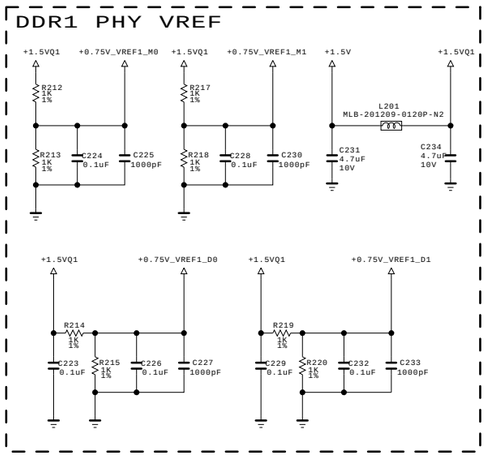


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SECRET
LGElectronics

LG ELECTRONICS

| | | | |
|---|---|---|---|
| MODEL | 240Hz Back-End Board | DATE | 2011. 07. 05 |
| BLOCK | LG1122_DDR3 | SHEET | 2 / 6 |

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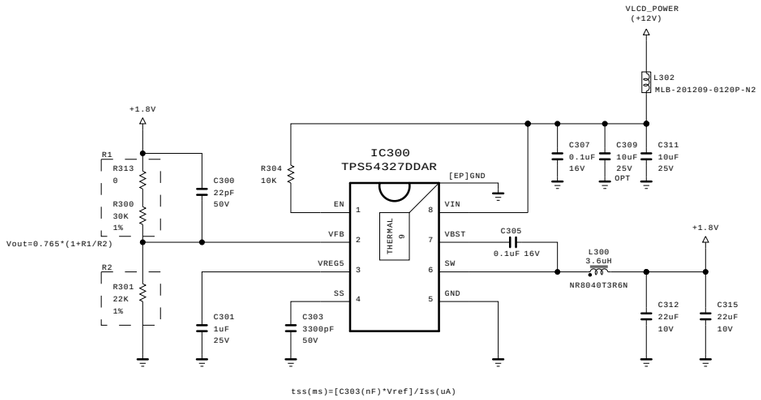
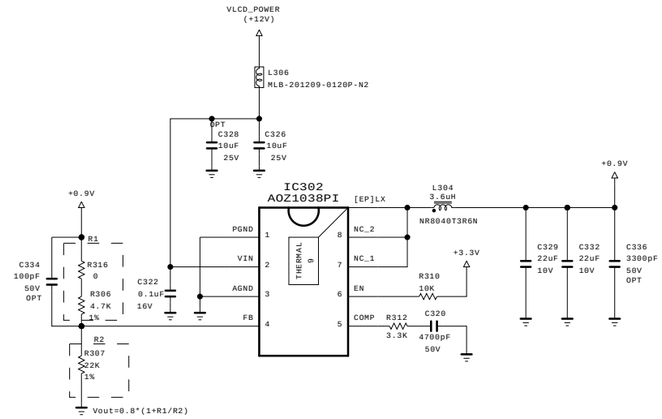
## FRC-III AIP for 1.8V

TYP 0.278A
MAX 0.345A



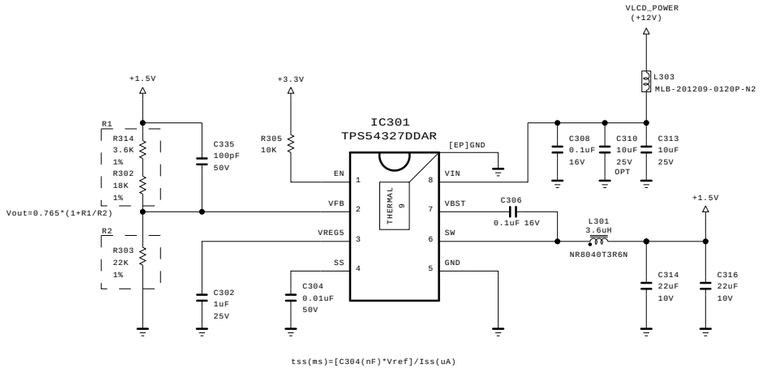

## FRC-III CORE for 0.9V

TYP 2.521A
MAX 3.124A



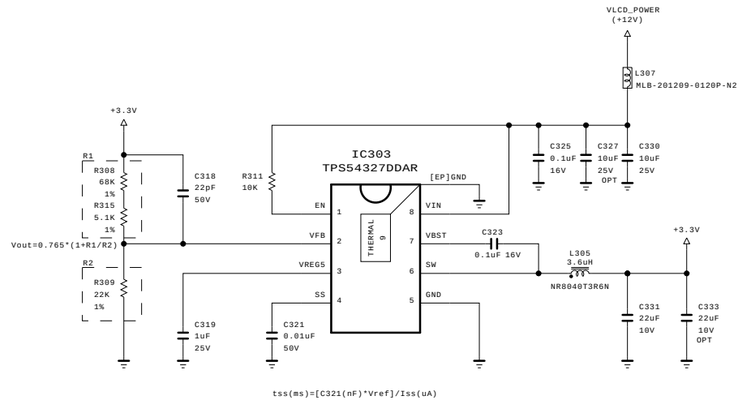

## FRC-III DDR3 for 1.5V

TYP 1.149A
MAX 1.184A

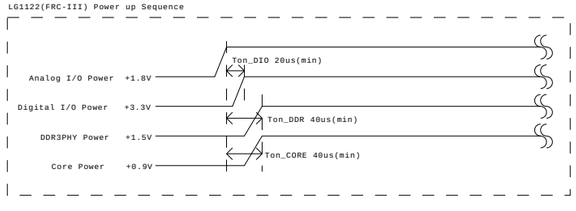



## FRC-III I/O for 3.3V

TYP 0.043A
MAX 0.046A




LG1122(FRC-III) Power up Sequence

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SECRET
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LG ELECTRONICS

| MODEL | 120Hz Back-End Board | DATE | 2011. 07. 05 |
|---|---|---|---|
| BLOCK | POWER | SHEET | 3 / 6 |

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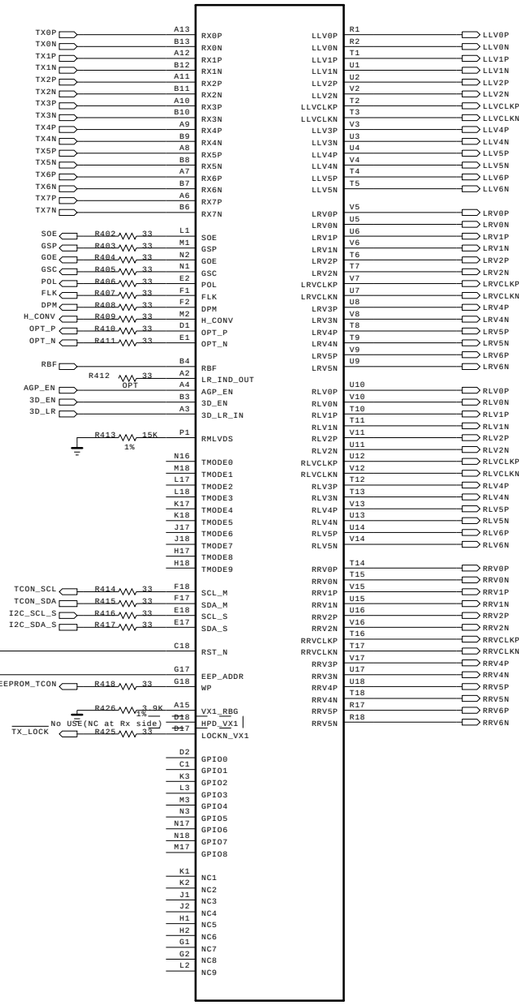
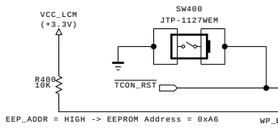
## IC401 LGE5812B

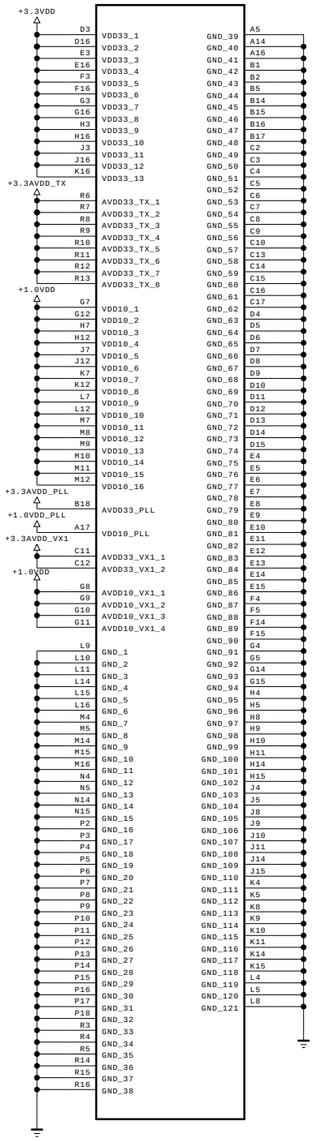

TX0P A13
TX0N B13
TX1P A12
TX1N B12
TX2P A11
TX2N B11
TX3P A10
TX3N B10
TX4P A9
TX4N B9
TX5P A8
TX5N B8
TX6P A7
TX6N B7
TX7P A6
TX7N B6
RX0P RX0N RX1P RX1N RX2P RX2N RX3P RX3N RX4P RX4N RX5P RX5N RX6P RX6N RX7P RX7N
SOE R402 33 L1
GSP R403 33 M1
GOE R404 33 N2
GSC R405 33 N1
POL R406 33 E2
FLK R407 33 F1
DPM R408 33 F2
H_CONV R409 33 M2
OPT_P R410 33 D1
OPT_N R411 33 E1
SOE GSP GOE GSC POL FLK DPM H_CONV OPT_P OPT_N
RBF B4
R412 33 OPT A2
AGP_EN A4
3D_EN B3
3D_LR A3
RBF LR_IND_OUT AGP_EN 3D_EN 3D_LR_IN
R413 15K 1% P1
RMLVDS
TMODE0 N16
TMODE1 M18
TMODE2 L17
TMODE3 L18
TMODE4 K17
TMODE5 K18
TMODE6 J17
TMODE7 J18
TMODE8 H17
TMODE9 H18
TCON_SCL R414 33 F18
TCON_SDA R415 33 F17
I2C_SCL_S R416 33 E18
I2C_SDA_S R417 33 E17
SCL_M SDA_M SCL_S SDA_S
TCON_RST C18
RST_N
G17
WP_EEPROM_TCON R418 33 G18
EEP_ADDR WP
R426 3.9K 1% A15
No USE(NC at Rx side) D18
TX_LOCK R425 33 D17
VX1_RBG HPD_VX1 LOCKN_VX1
D2 C1 K3 L3 M3 N3 N17 N18 M17
GPIO0 GPIO1 GPIO2 GPIO3 GPIO4 GPIO5 GPIO6 GPIO7 GPIO8
K1 K2 J1 J2 H1 H2 G1 G2 L2
NC1 NC2 NC3 NC4 NC5 NC6 NC7 NC8 NC9
LLV0P R1 LLV0N R2 LLV1P T1 LLV1N U1 LLV2P U2 LLV2N V2 LLVCLKP T2 LLVCLKN T3 LLV3P V3 LLV3N U3 LLV4P U4 LLV4N V4 LLV5P T4 LLV5N T5 LLV6P LLV6N
LRV0P V5 LRV0N U5 LRV1P U6 LRV1N V6 LRV2P T6 LRV2N T7 LRVCLKP V7 LRVCLKN U7 LRV3P U8 LRV3N V8 LRV4P T8 LRV4N T9 LRV5P V9 LRV5N U9 LRV6P LRV6N
RLV0P U10 RLV0N V10 RLV1P T10 RLV1N T11 RLV2P V11 RLV2N U11 RLVCLKP U12 RLVCLKN V12 RLV3P T12 RLV3N T13 RLV4P V13 RLV4N U13 RLV5P U14 RLV5N V14 RLV6P RLV6N
RRV0P T14 RRV0N T15 RRV1P V15 RRV1N U15 RRV2P U16 RRV2N V16 RRVCLKP T16 RRVCLKN T17 RRV3P V17 RRV3N U17 RRV4P U18 RRV4N T18 RRV5P R17 RRV5N R18 RRV6P RRV6N

I2C Slave Address : 0x70

1. RBF
   - Pattern selection of No Video input
     LOW : Rolling Pattern
     HIGH : Black Pattern
2. AGP_EN
   - NO input indicator
     LOW : Normal
     HIGH : No input
3. 3D_EN
   - 2D/3D mode selection
     LOW : 2D mode
     HIGH : 3D mode
4. 3D_LR
   - Left/Right frame Indicator
     LOW : Left
     HIGH : Right

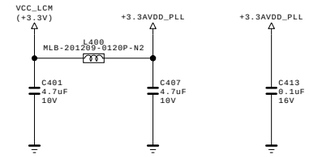



## IC401 LGE5812B

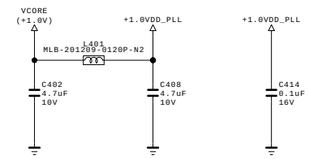



[All of OPT decaps must be placed on PCB Bottom side]

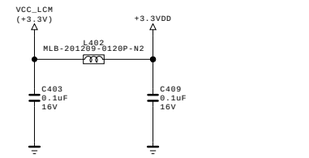
### +3.3AVDD_PLL Decaps



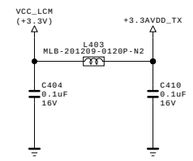

### +1.0VDD_PLL Decaps



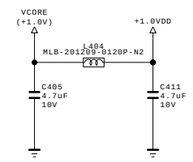

### +3.3VDD Decaps



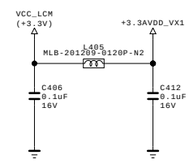

### +3.3AVDD_TX Decaps



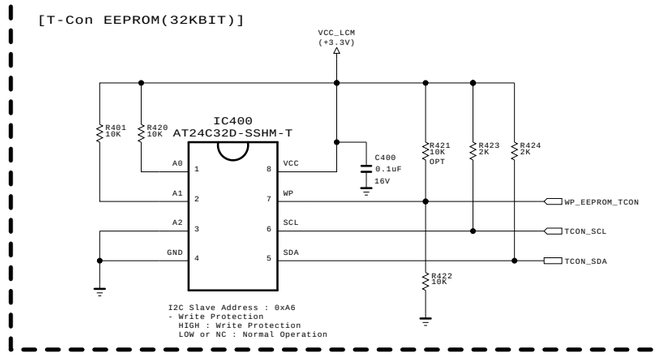

### +1.0VDD Decaps



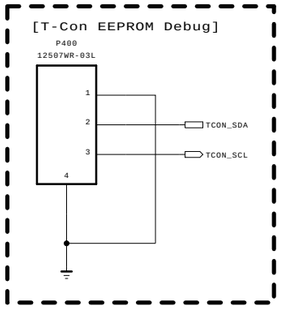

### +3.3AVDD_VX1 Decaps




### [T-Con EEPROM(32KBIT)]




### [T-Con EEPROM Debug]

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SECRET
LGElectronics

LG ELECTRONICS

| MODEL | 240Hz Back-End Board | DATE | 2011. 07. 05 |
|---|---|---|---|
| BLOCK | 240Hz T-Con(LG5812) | SHEET | 4 / 6 |

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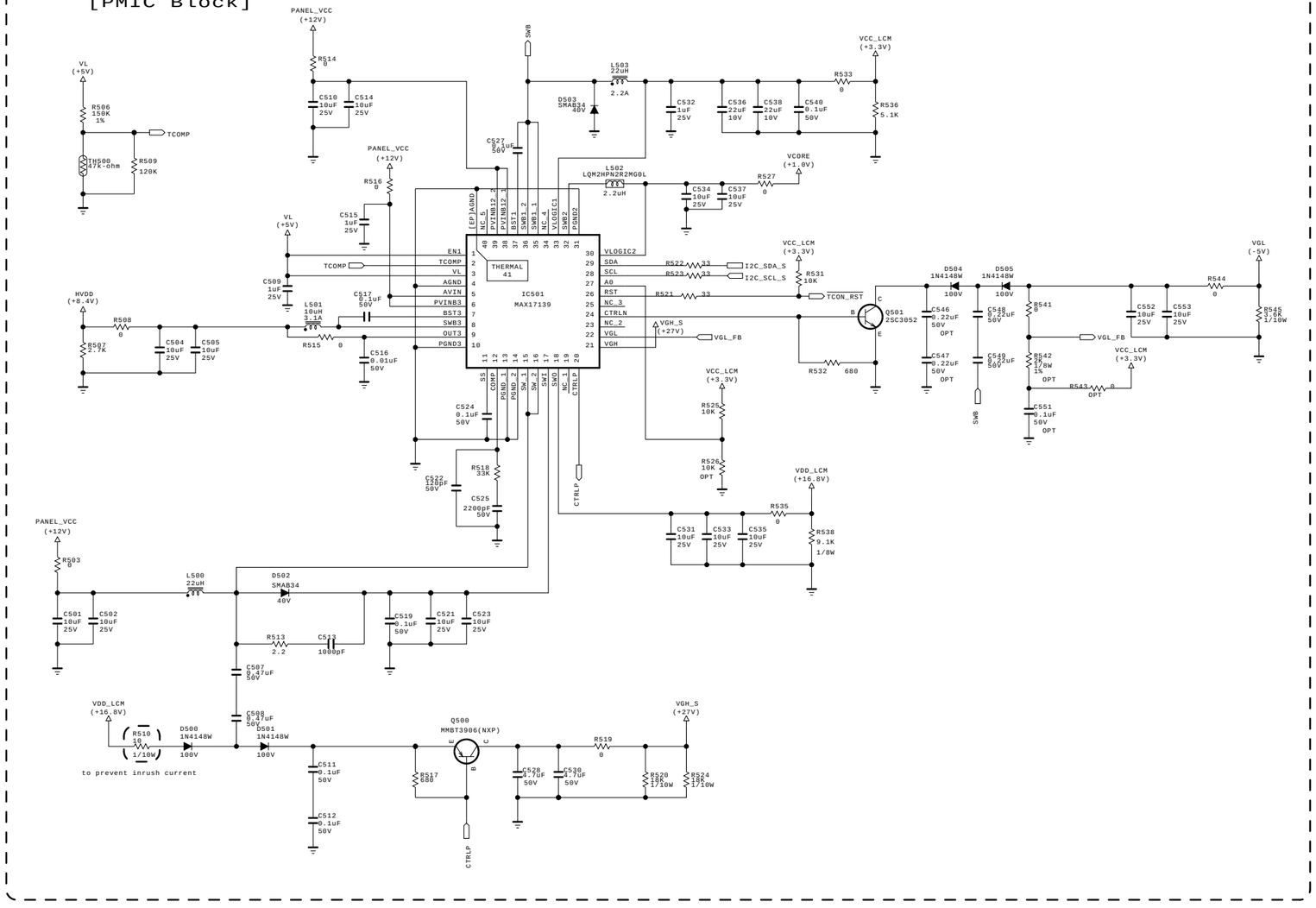
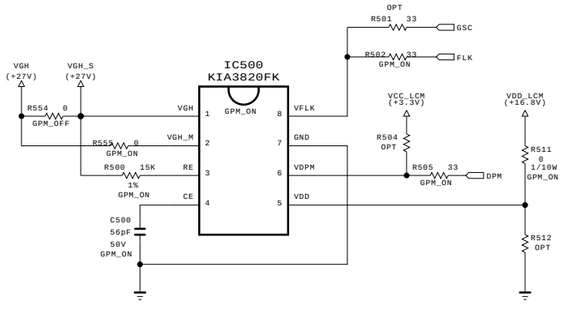
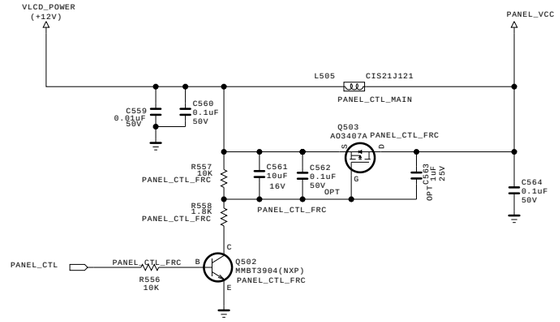
## [PMIC Block]



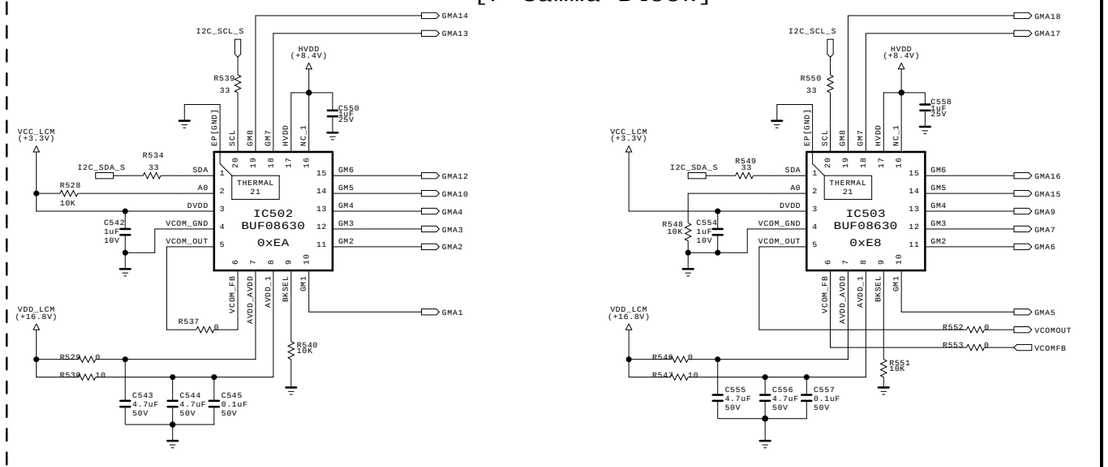

## [GPM Block]




## PANEL_POWER




## [P-Gamma Block]




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

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LG ELECTRONICS

| MODEL | 240Hz Back-End Board | DATE | 2011. 07. 05 |
|---|---|---|---|
| BLOCK | PMIC/GAMMA/GPM | SHEET | 5 / 6 |

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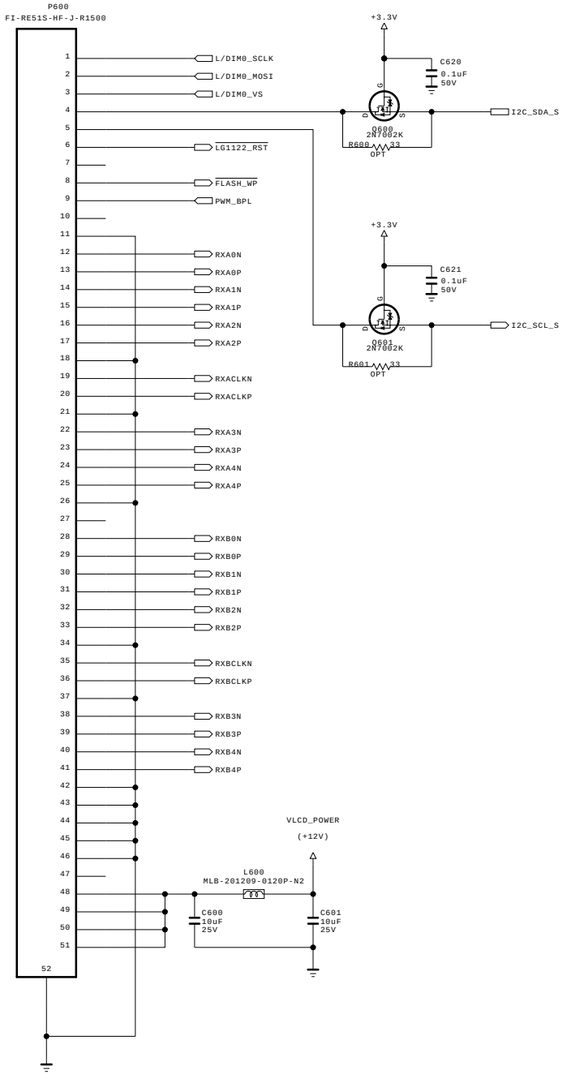
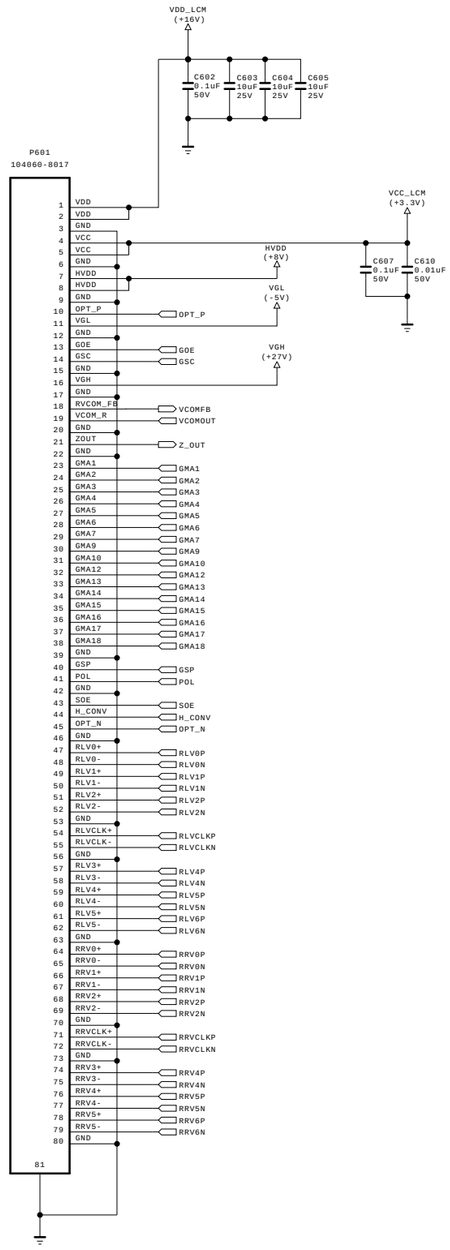
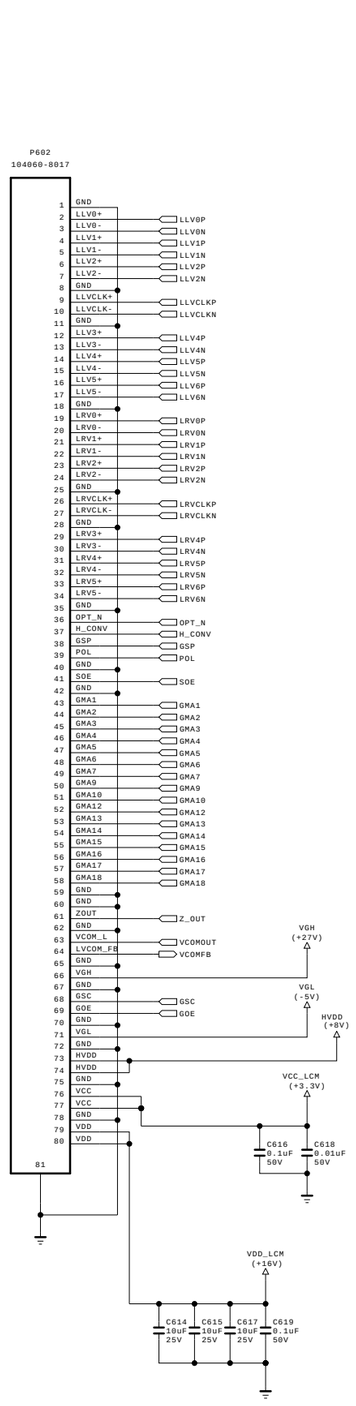
## [51P HS-LVDS input wafer]




## [80P mini-LVDS output wafer]




[RIGHT FFC CONNECTOR]




[LEFT FFC CONNECTOR]

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | 240Hz Back-End Board | DATE | 2011. 07. 05 |
|---|---|---|---|
| BLOCK | Wafer | SHEET | 6 / 6 |

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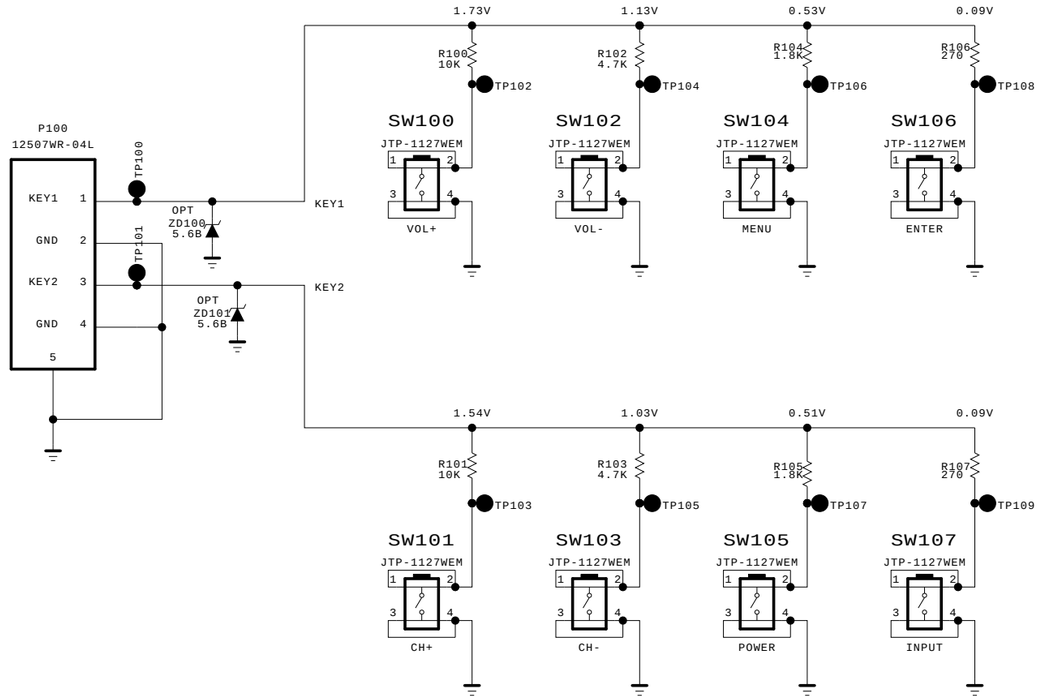
Revision History

(0) Proto Design




THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

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LG ELECTRONICS

| MODEL | | DATE | |
|---|---|---|---|
| BLOCK | | SHEET | / |

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LG
Life's Good

# LCD TV Repair Guide

## `12 years New Models

**< Applicable Model >**

**XXLM960V-ZB**

**XXLM860V-ZB**

**V : T2/C/S2**
**T : T2/C**
**S : T/C/S2**
**0 : T/C**

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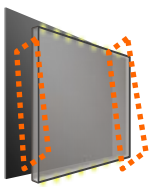
# 2 types of LED - Edge

## Benefit: More Clear More Real

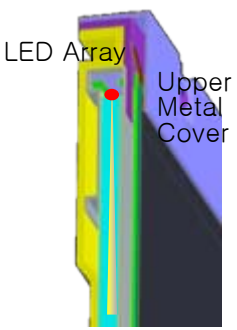


# Edge Type w/ Local Dimming

**Feature**

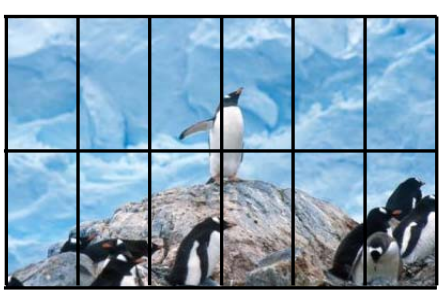
| | |
|---|---|
| ***Edge LED*** | Best picture quality + thin TV |
| ***Local Dimming*** | Local dimming depicts more deep black. |

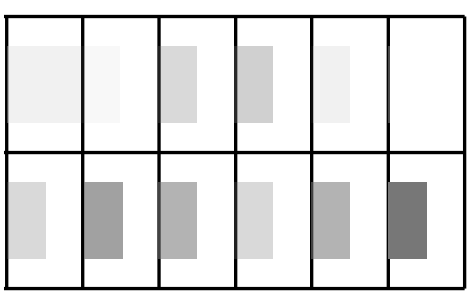
**BLU structure**



LED Array is on the side of Module

**Local Dimming**





**Model**

**XXLW750T/W/S/G**

**42inch : H(2) * V(8) = 16Block**
**42inch : H(2) * V(8) = 16Block**
**42inch : H(2) * V(8) = 16Block**

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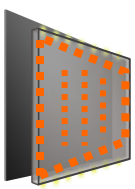
# 2 types of LED - ALEF

## Benefit: More Clear More Real

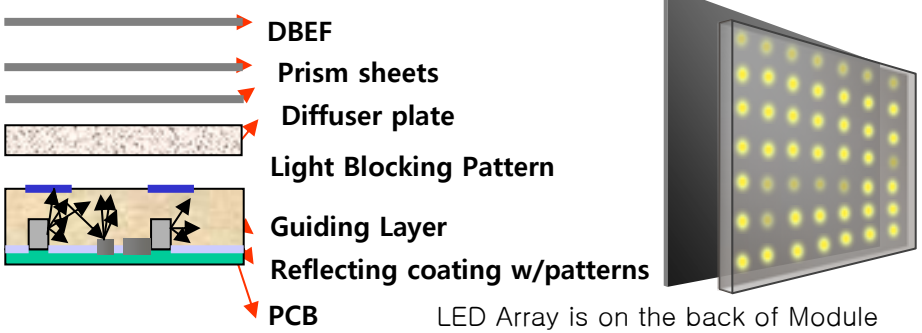


## ALEF Type
## Local Dimming

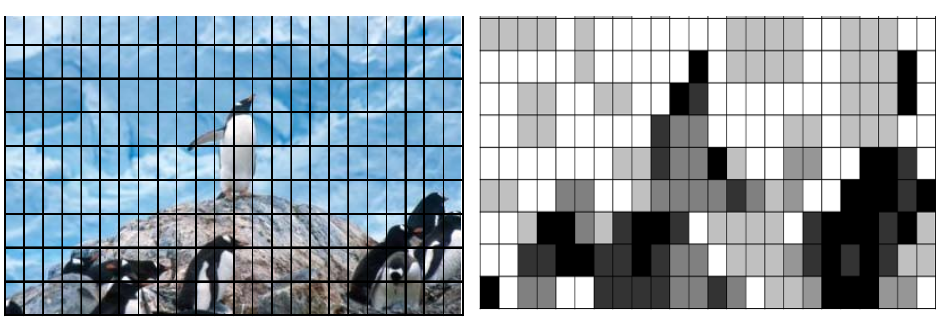
**Feature**

| | |
|---|---|
| ***ALEF LED*** | Best picture quality + thin TV<br>Slimmer depth<br>better picture quality |
| ***Local Dimming*** | Local dimming depicts more deep black. |

**BLU structure**




**Local Dimming**



**Model**

**XXLM960V**
**47inch : H(6) * V(4) = 24Block**
**55inch : H(6) * V(4) = 24Block**

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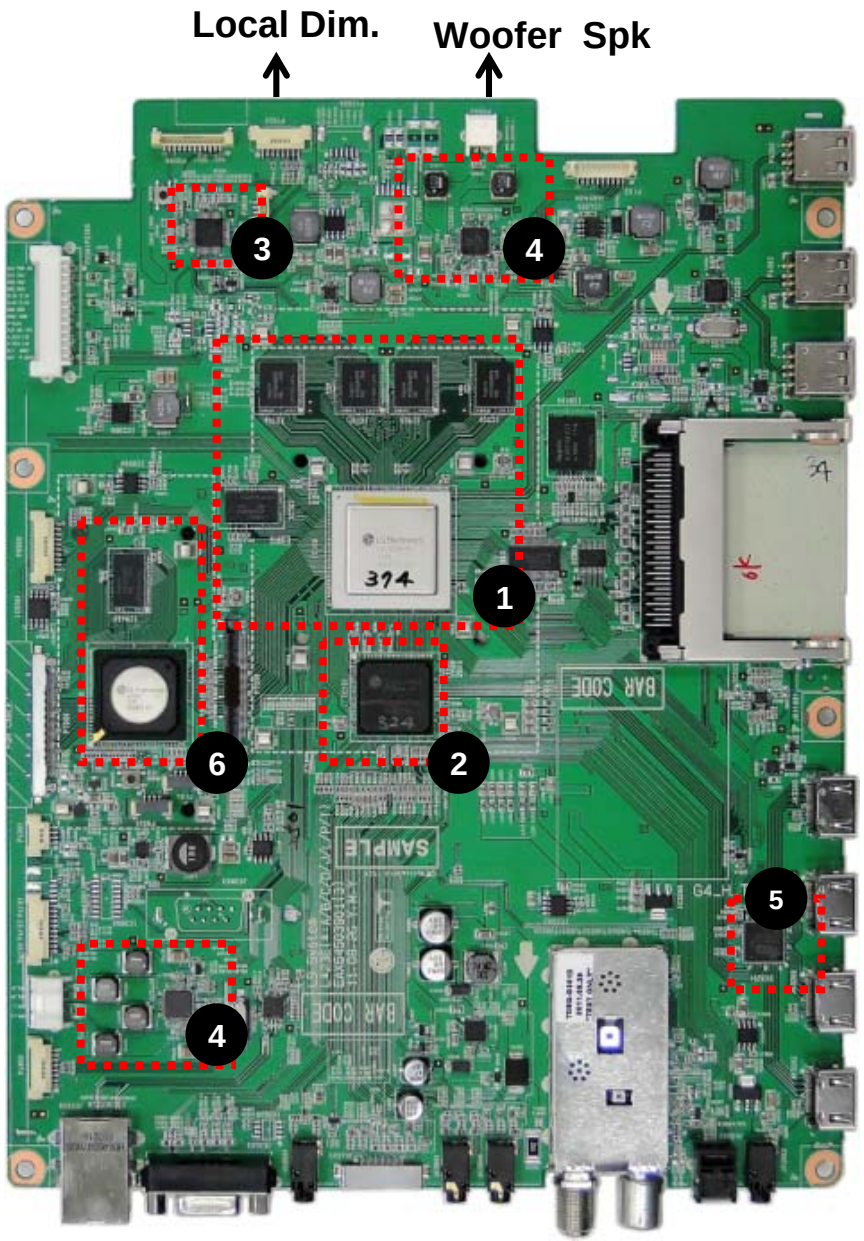
# Main PCB for Broadband

Main + TCON all in one

**XXLM960V-ZB**
**XXLM860V-ZB**




1. Main processor_Digital(LG1152D), DDR Memory, Flash Memory
2. Main processor_analog(LG1152A)
3. Micom for Key/IR sensing
4. Audio AMP (10W+10W)
5. HDMI switch (4:1)
6. 3D Depth Control IC, DDR Memory

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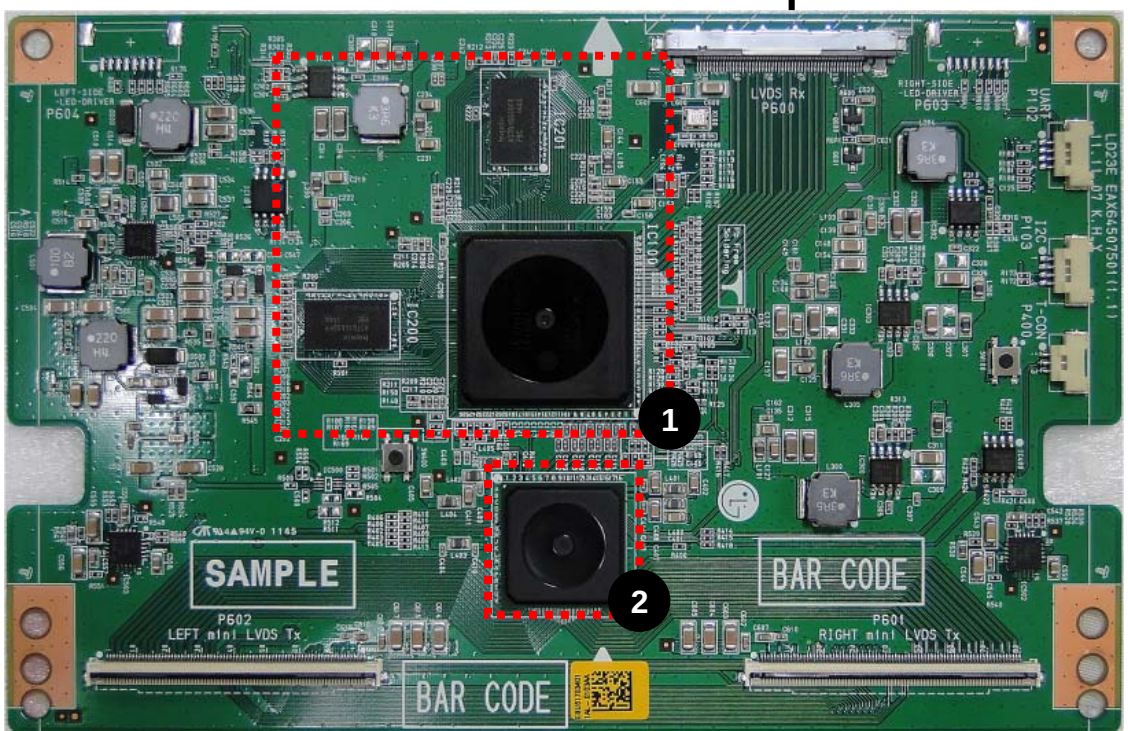
## XXLM960V-ZB

From Main Board




To Pannel ( Left )

To Pannel ( Right )

1 FRC Processor(LG1122)

2 T-Con IC(LG5812)

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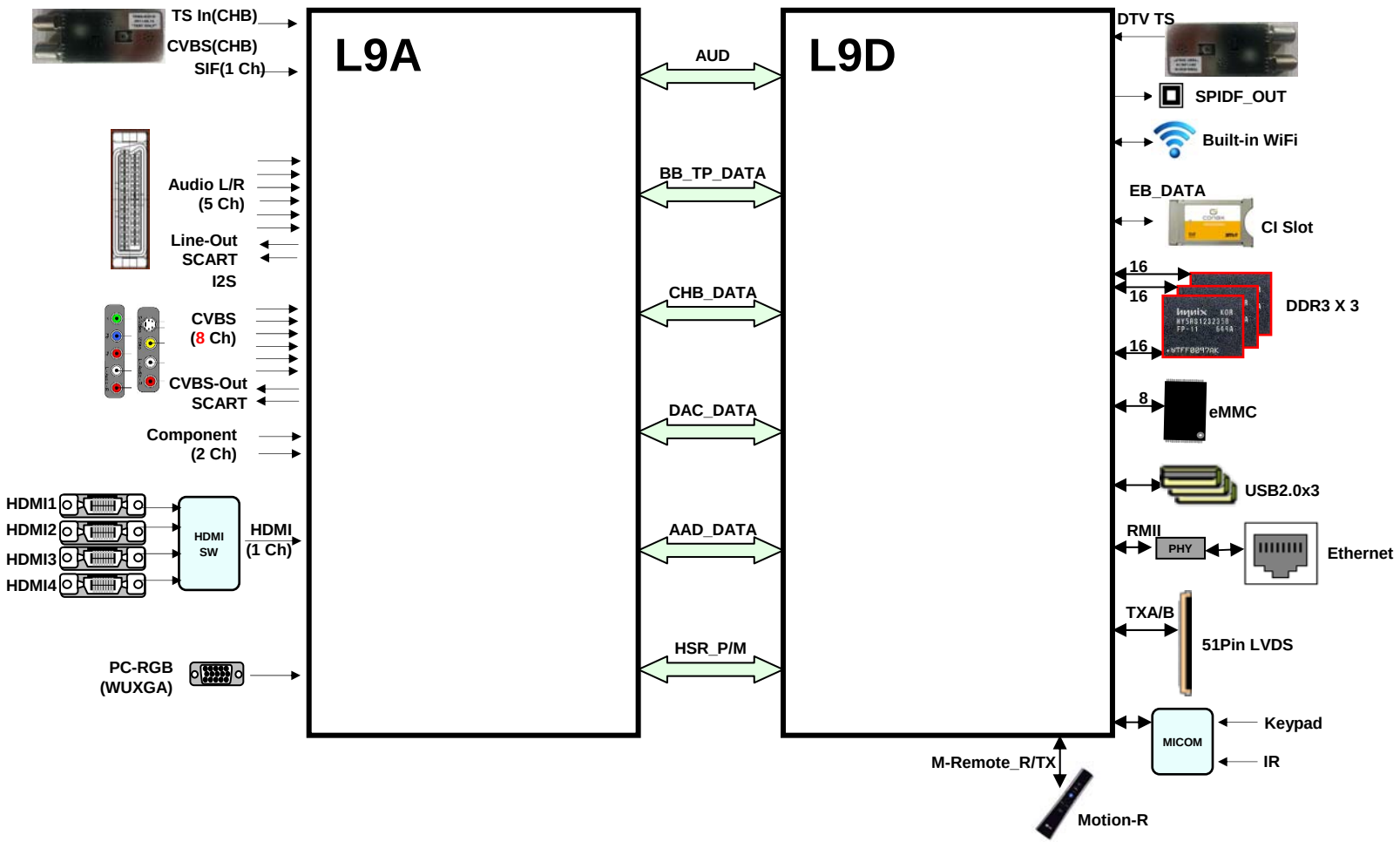
# Block Diagram

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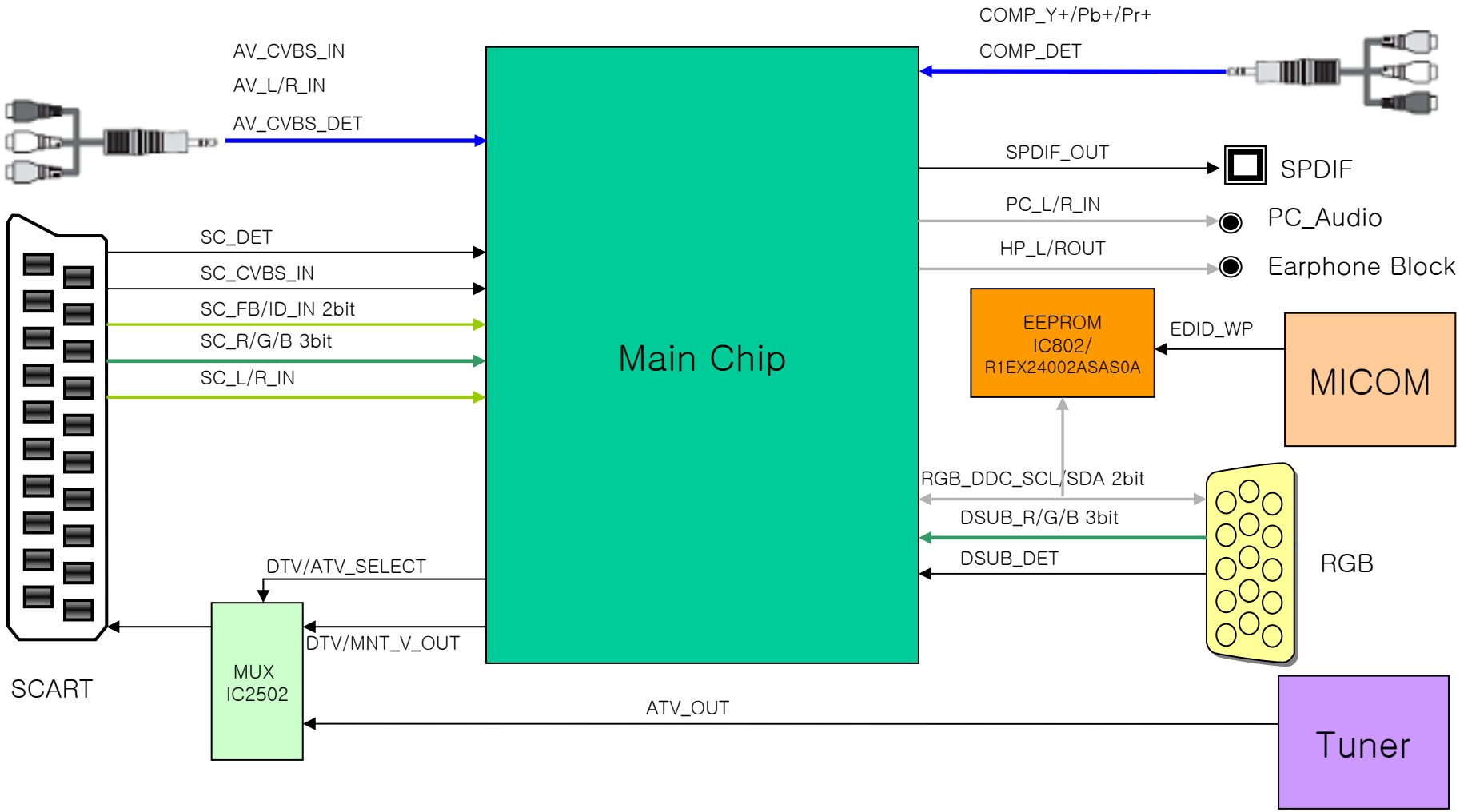
# Jack Interface

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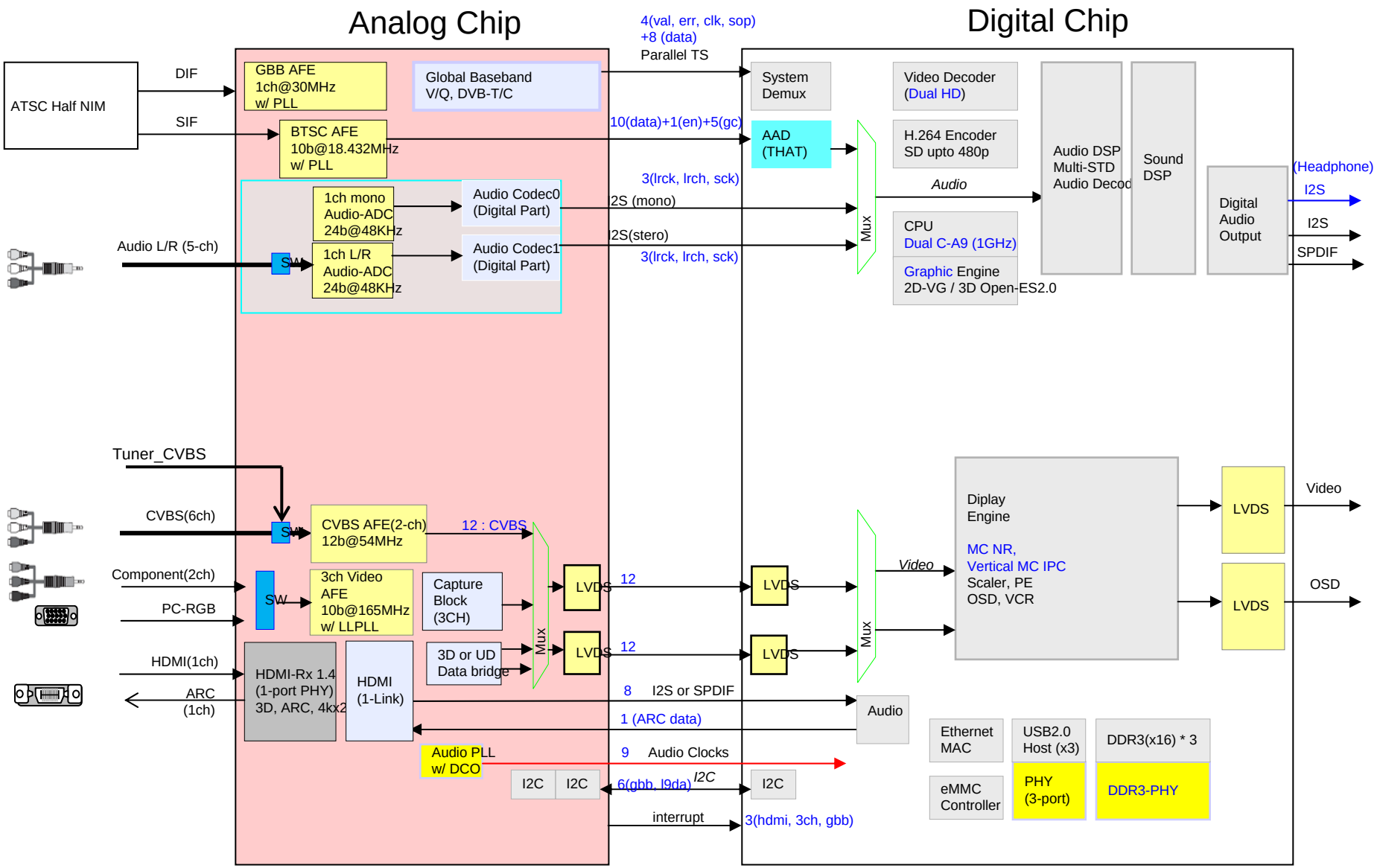
# L9 Block diagram

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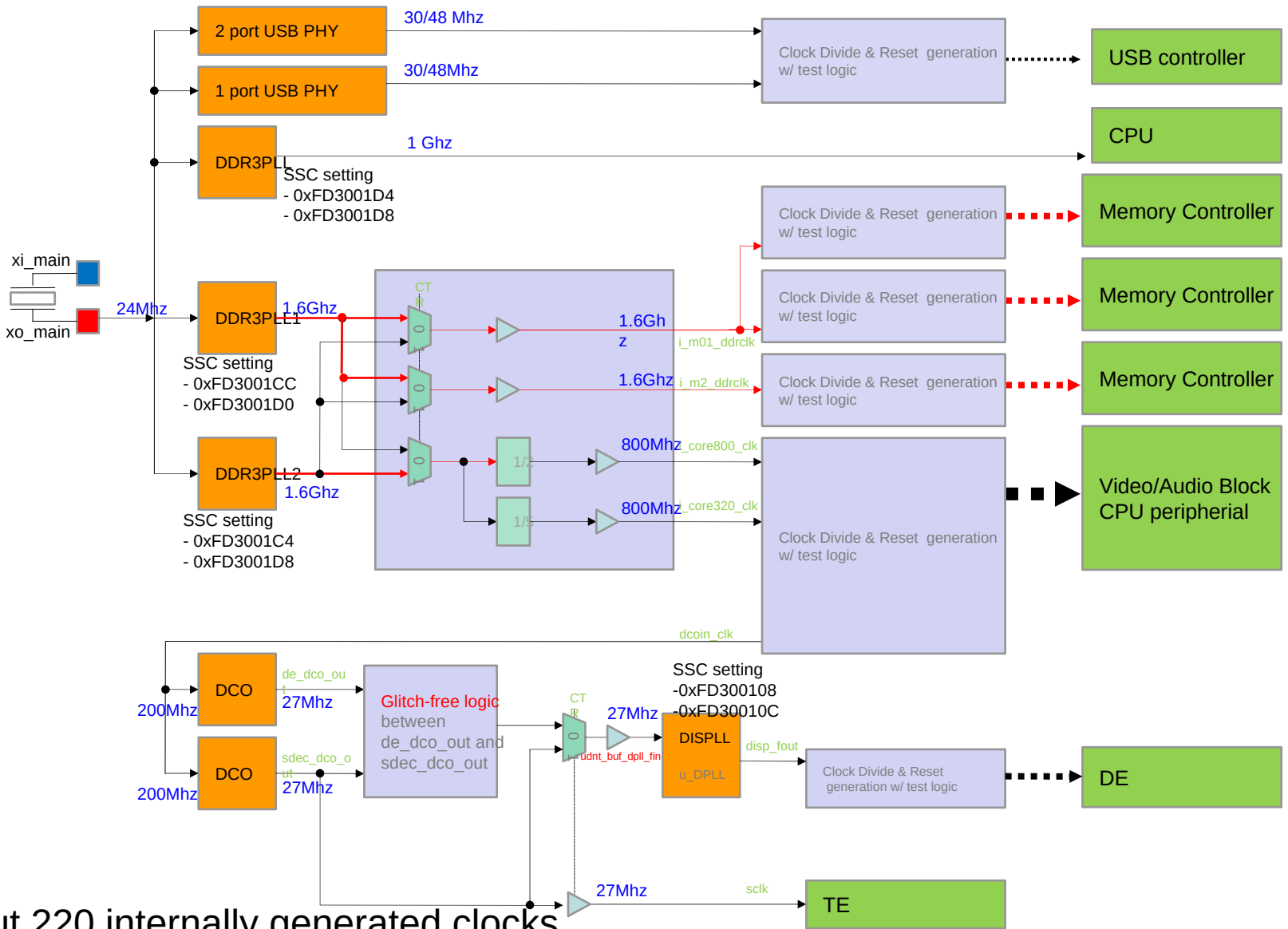
# L9 Block diagram




About 220 internally generated clocks

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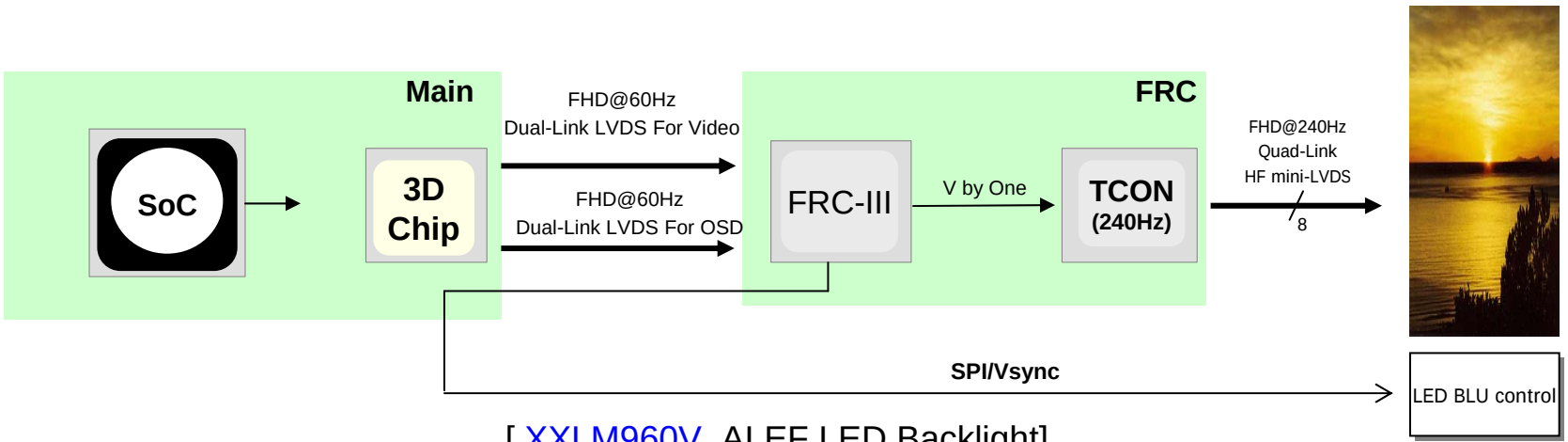
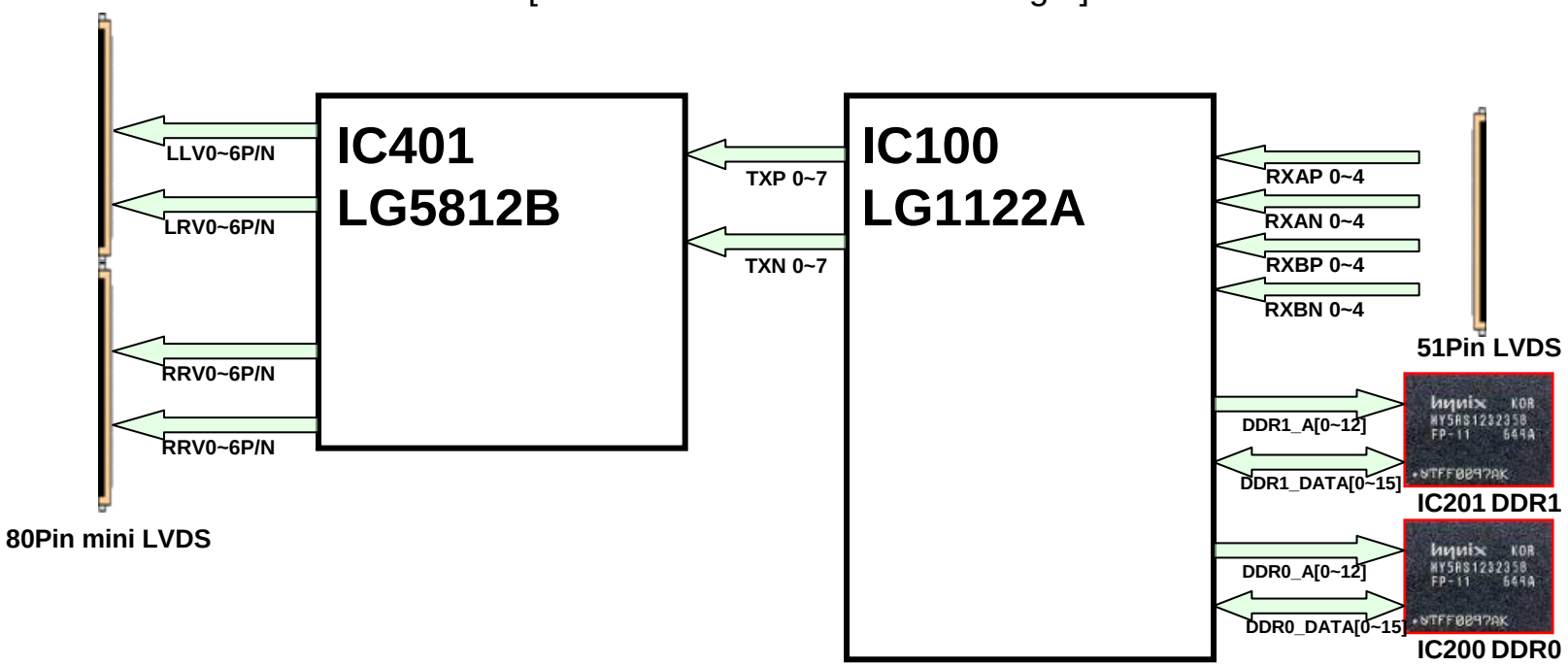
# Appendix. Block Diagram for Edge/ALEF Backlight




[ XXLM960V ALEF LED Backlight]

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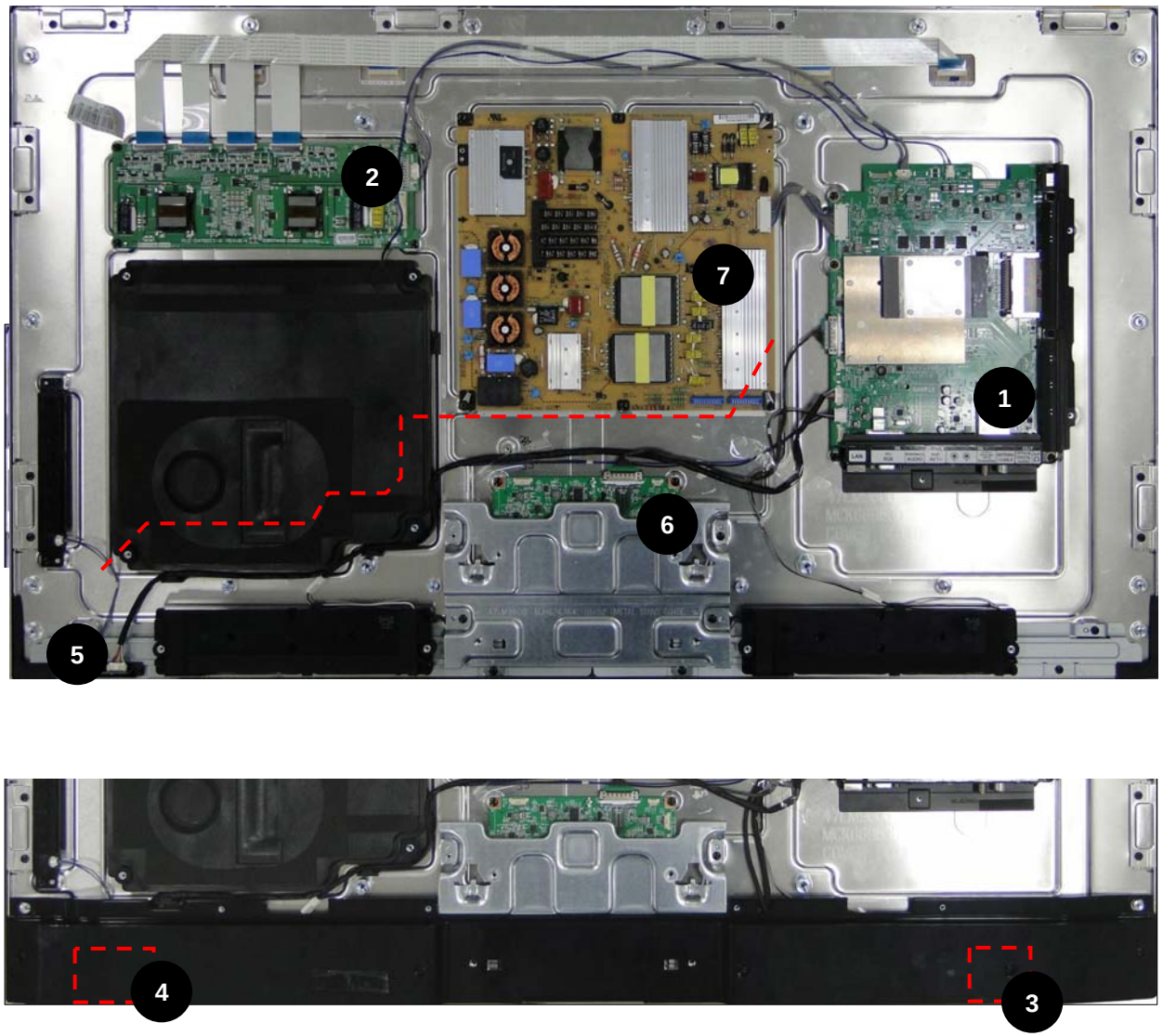
# Interconnection - 1

## XXLM960V-ZB







[PCBs]

1. Main PCB
2. LED driver
3. WIFI ASSY
4. RF MOTION ASSY
5. IR Key PCB
6. FRC ASSY
7. PSU

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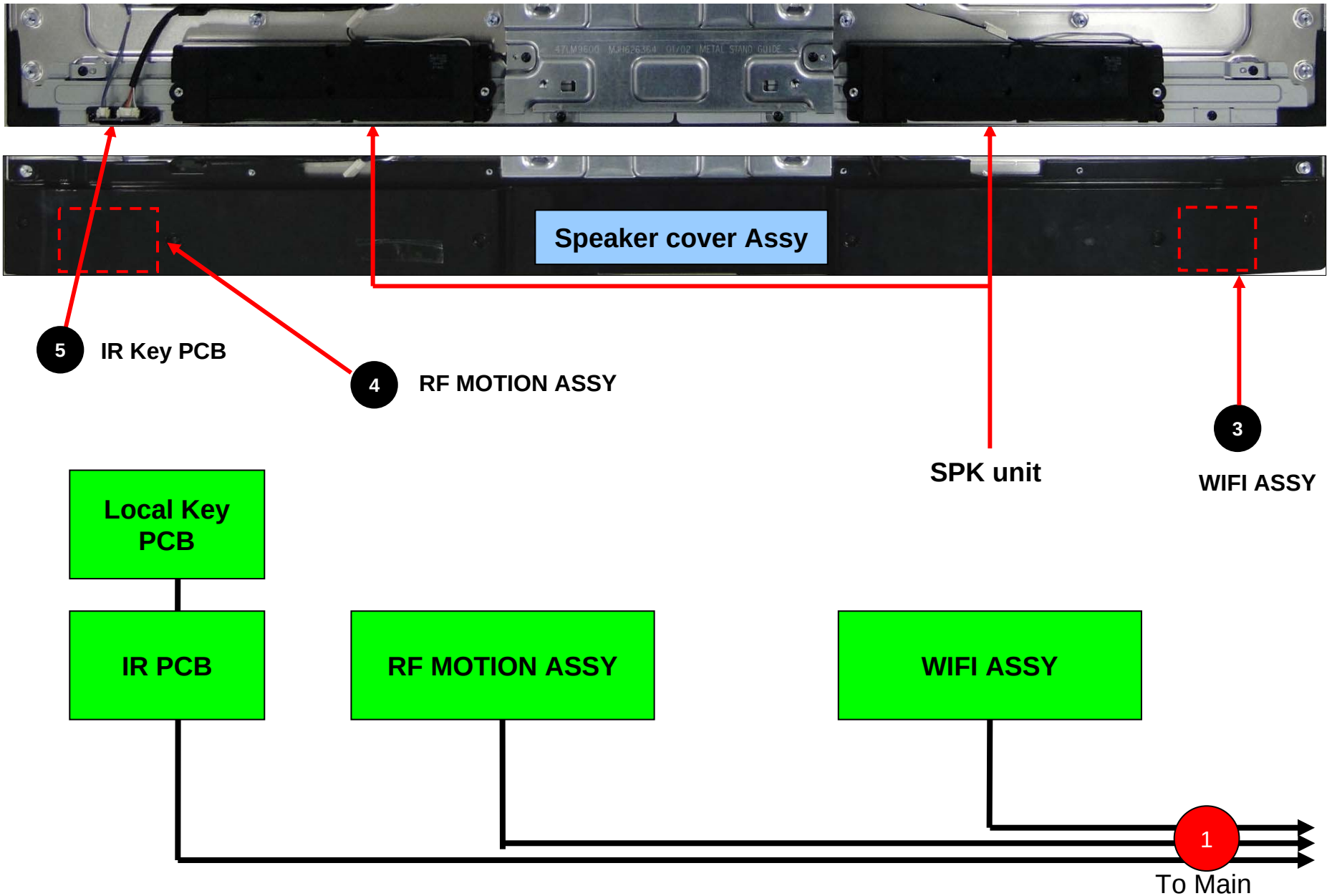
# Interconnection – sub PCB( XXLM960V Series )

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# Contents of LCD TV Standard Repair Process


| No. | Error symptom (High category) | Error symptom (Mid category) | Page | Remarks |
|---|---|---|---|---|
| 1 | A. Video error | No video/Normal audio | 1 | |
| 2 | | No video/No audio | 2 | |
| 3 | | Picture broken/ Freezing | 3 | |
| 4 | | Color error | 4 | |
| 5 | | Vertical/Horizontal bar, residual image, light spot, external device color error | 5 | |
| 6 | B. Power error | No power | 6 | |
| 7 | | Off when on, off while viewing, power auto on/off | 7 | |
| 8 | C. Audio error | No audio/Normal video | 8 | |
| 9 | | Wrecked audio/discontinuation/noise | 9 | |
| 10 | D. Function error | Remote control & Local switch checking | 10 | |
| 11 | | M4 operating checking | 11 | |
| 12 | | Wifi operating checking | 12 | |
| 13 | | External device recognition error | 13 | |
| 14 | E. Noise | Circuit noise, mechanical noise | 14 | |
| 15 | F. Exterior error | Exterior defect | 15 | |


First of all, Check whether there is SVC Bulletin in GCSC System for these model.


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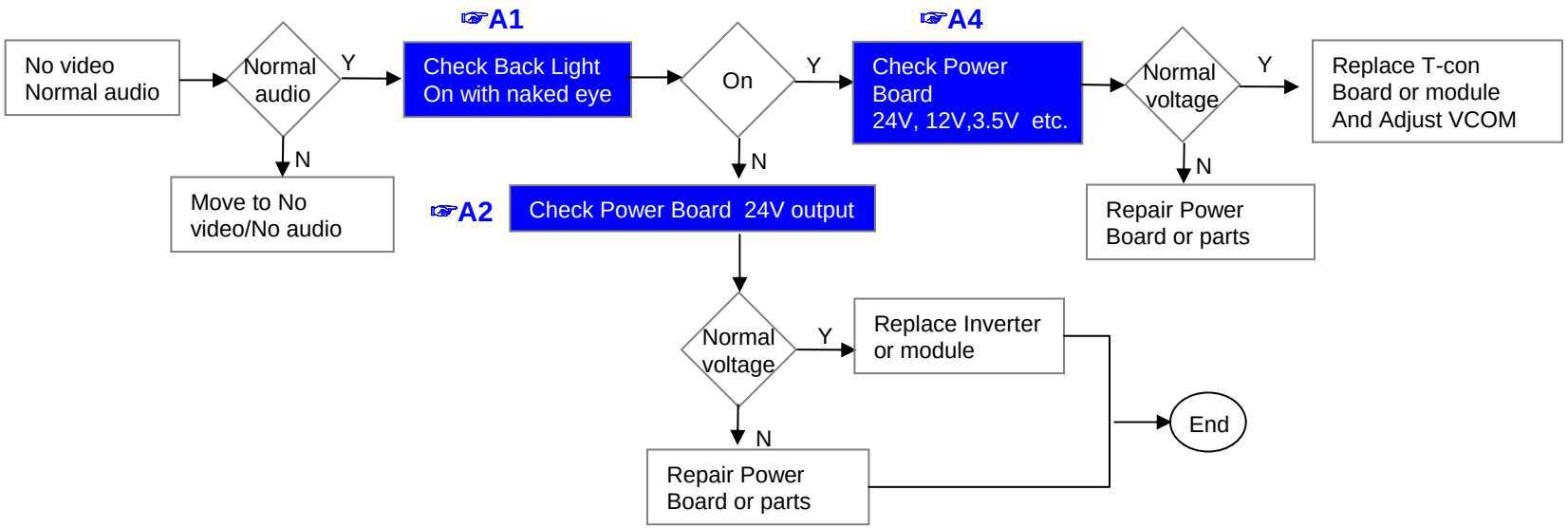
| LCD TV | Error symptom | A. Video error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | No video/ Normal audio | Revised date | | 1/15 |

**First of all, Check whether all of cables between board is inserted properly or not.**
**(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable,,,)**




※Precaution ☞A7 & A3

Always check & record S/W Version and White Balance value before replacing the Main Board → Replace Main Board → Re-enter White Balance value



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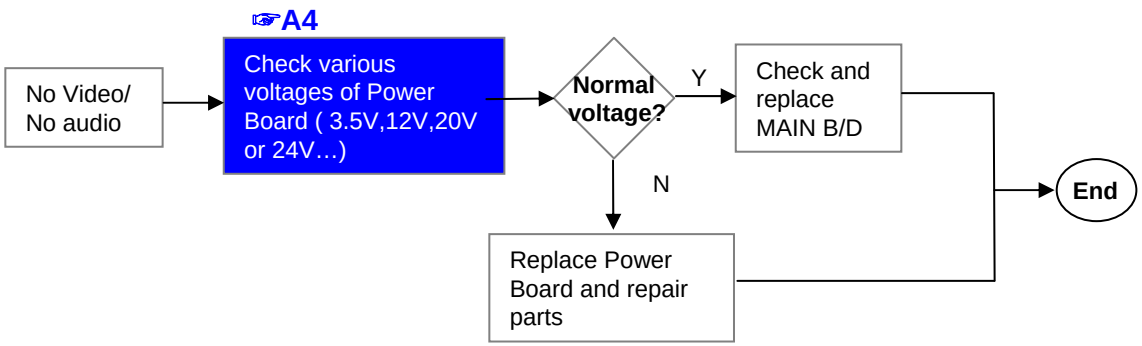
| LCD TV | Error symptom | A. Video error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | No video/ No audio | Revised date | | 2/15 |



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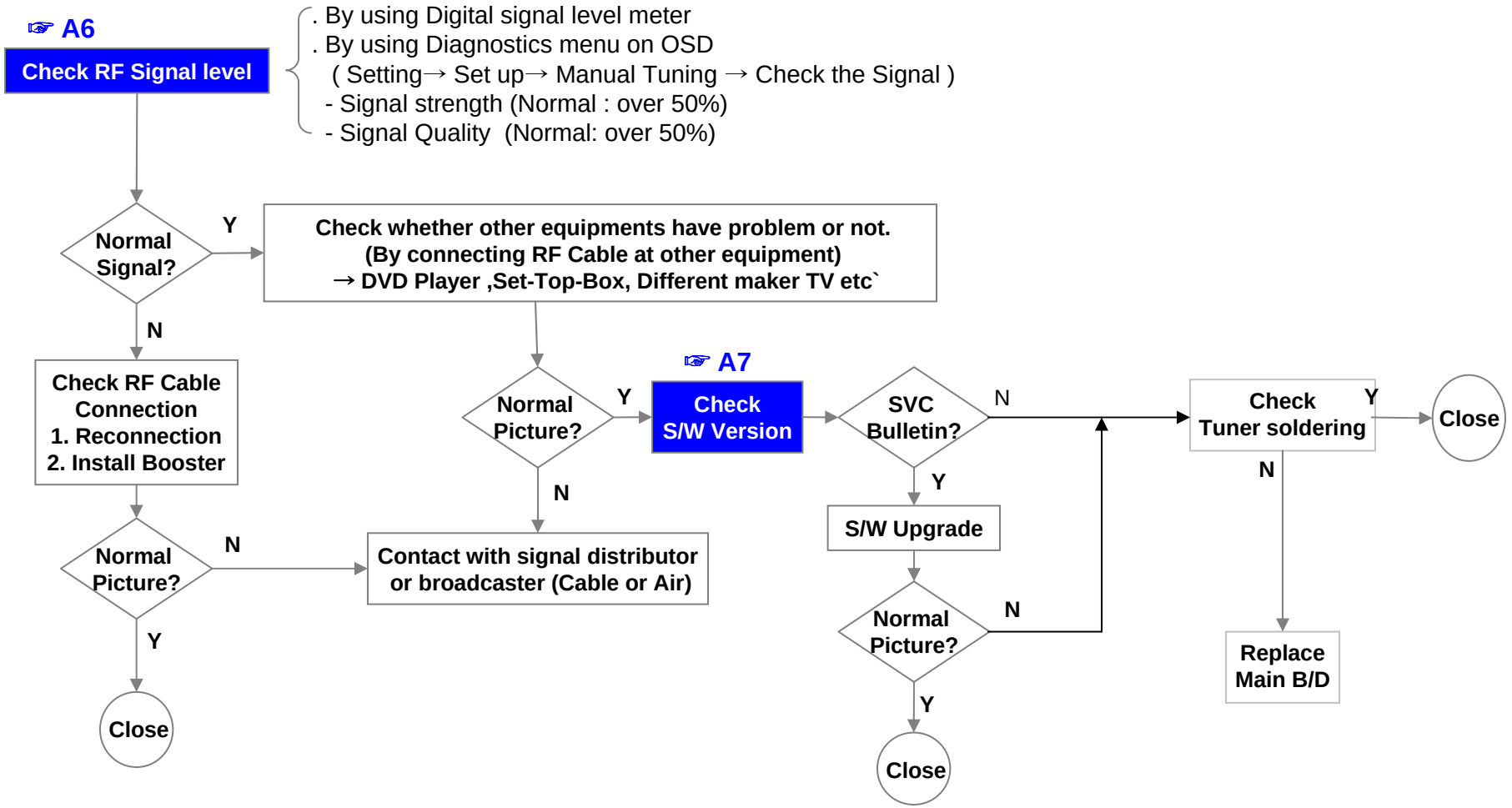
| LCD TV | Error symptom | A. Video error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Picture broken/ Freezing | Revised date | | 3/15 |



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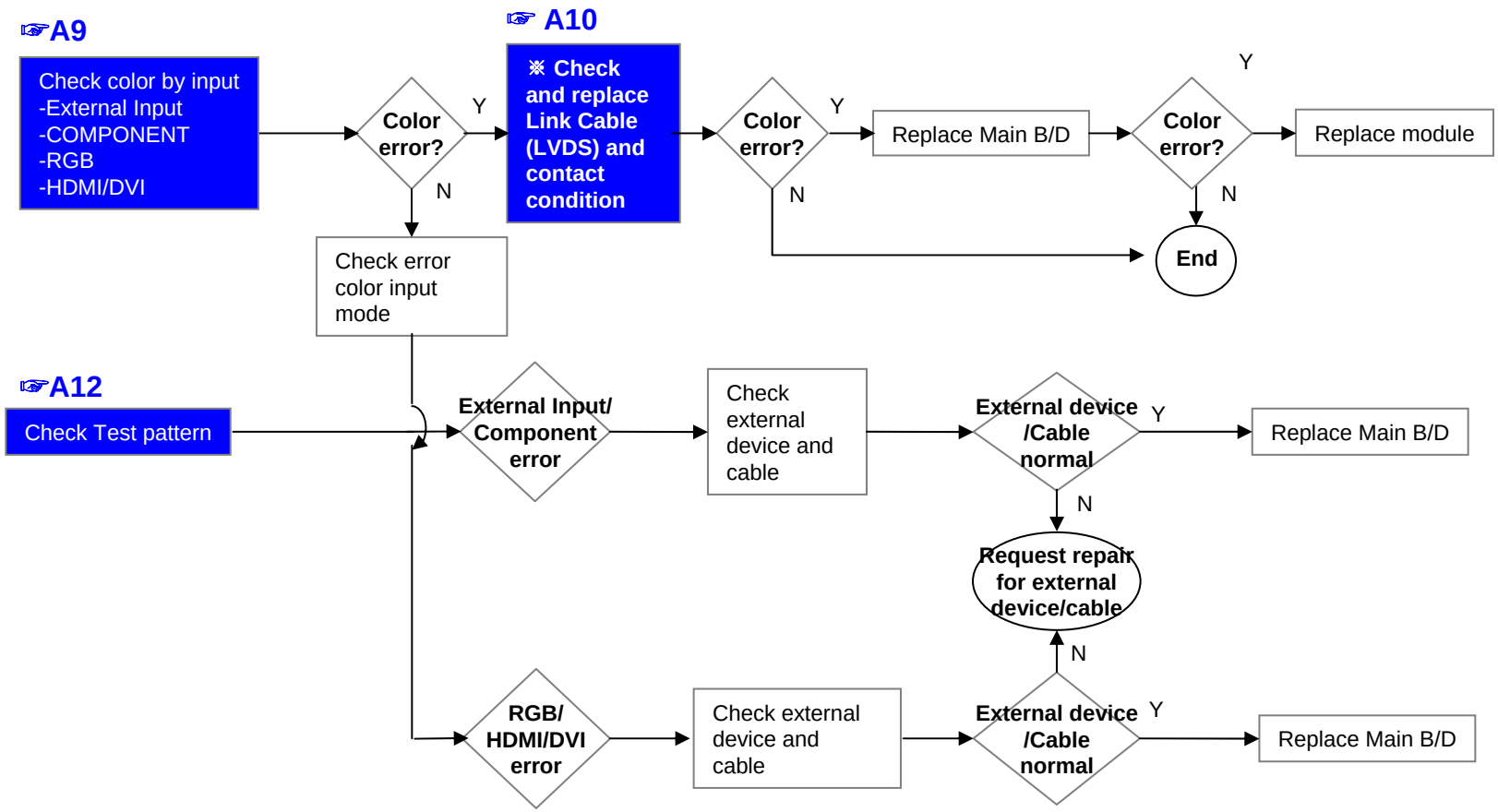
| LCD TV | Error symptom | A. Video error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Color error | Revised date | | 4/15 |



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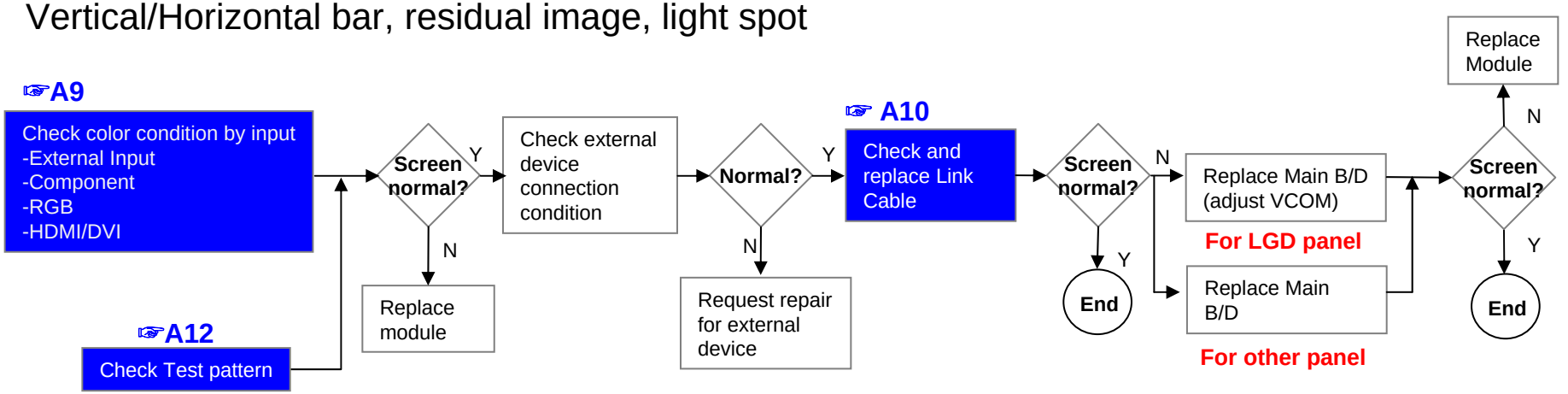
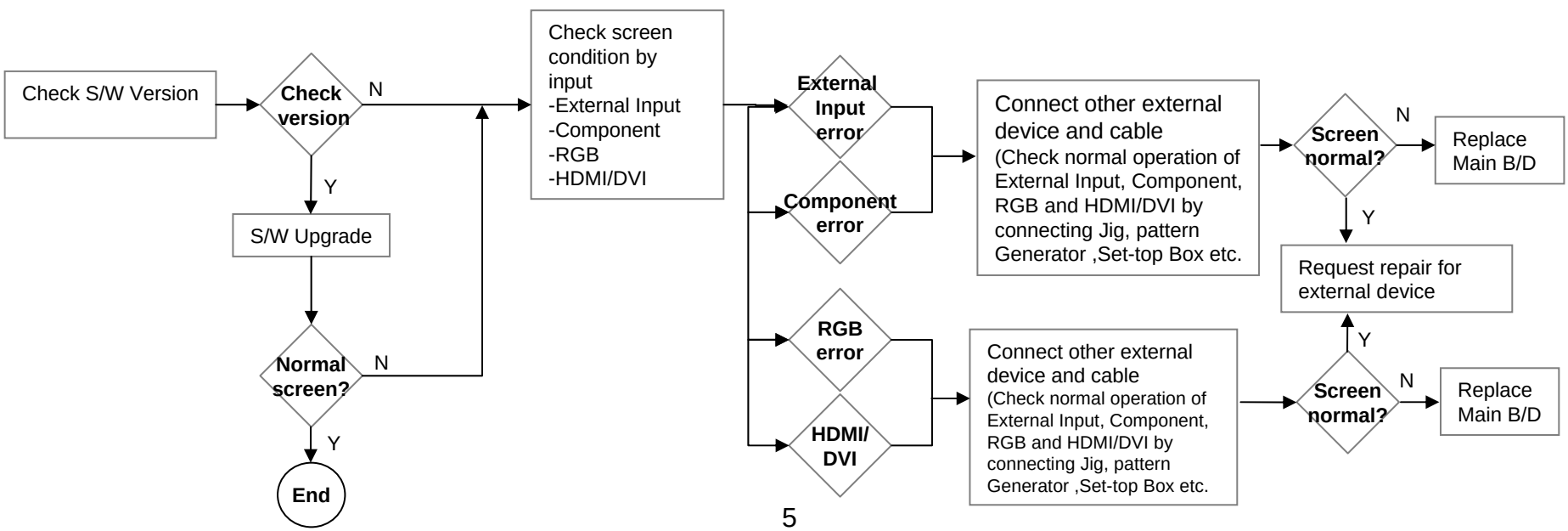
| LCD TV | Error symptom | A. Video error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Vertical / Horizontal bar, residual image, light spot, external device color error | Revised date | | 5/15 |

## Vertical/Horizontal bar, residual image, light spot




## External device screen error-Color error



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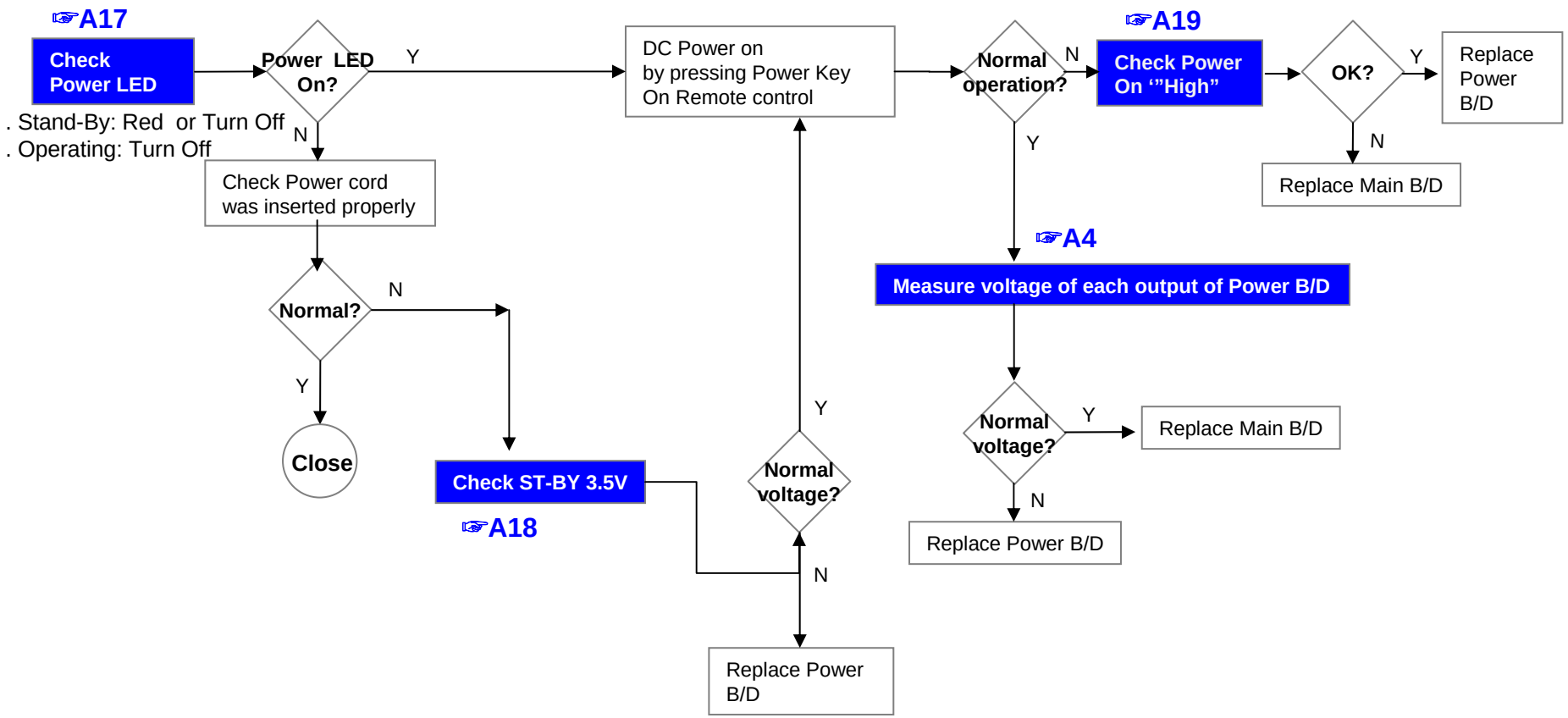
| LCD TV | Error symptom | B. Power error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | No power | Revised date | | 6/15 |



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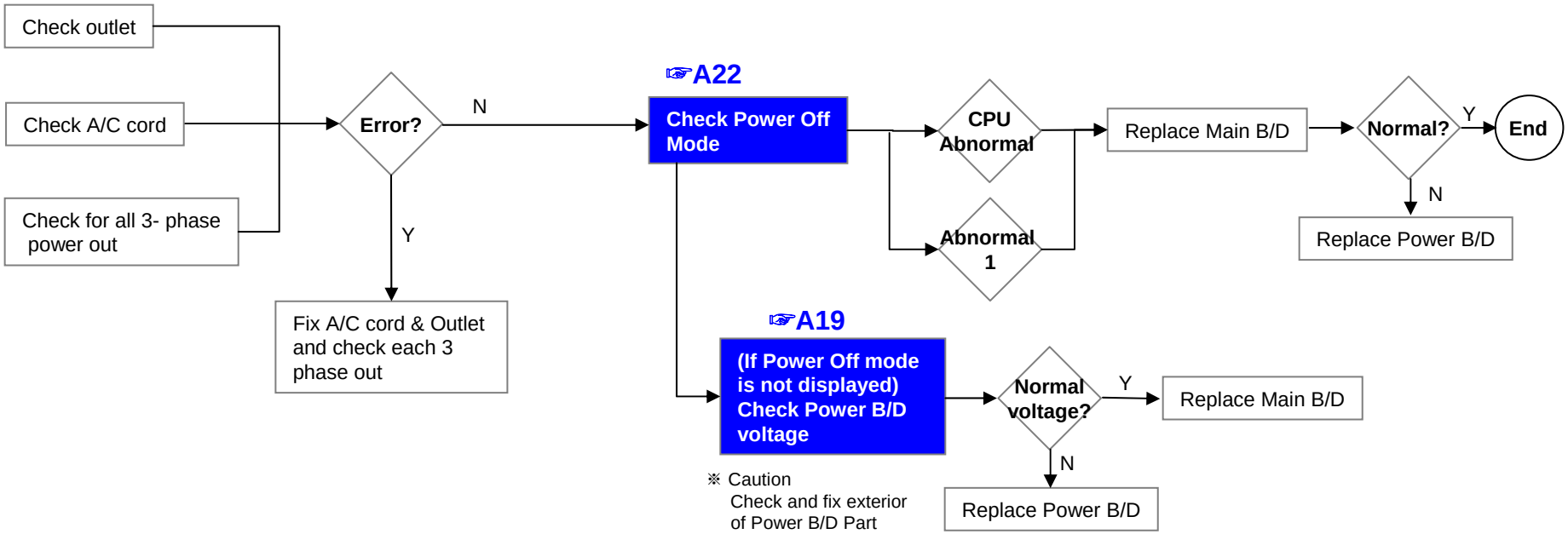
| LCD TV | Error symptom | B. Power error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Off when on, off while viewing, power auto on/off | Revised date | | 7/15 |




*** Please refer to the all cases which can be displayed on power off mode.**

| Status | Power off List | Explanation |
|---|---|---|
| Normal | "POWEROFF_REMOTEKEY" | Power off by REMOTE CONTROL |
| | "POWEROFF_OFFTIMER" | Power off by OFF TIMER |
| | "POWEROFF_SLEEPTIMER" | Power off by SLEEP TIMER |
| | "POWEROFF_INSTOP" | Power off by INSTOP KEY |
| | "POWEROFF_AUTOOFF" | Power off by AUTO OFF |
| | "POWEROFF_ONTIMER" | Power off by ON TIMER |
| | "POWEROFF_RS232C" | Power off by RS232C |
| | "POWEROFF_RESREC" | Power off by Reservated Record |
| | "POWEROFF_RECEND" | Power off by End of Recording |
| | "POWEROFF_SWDOWN" | Power off by S/W Download |
| | "POWEROFF_UNKNOWN" | Power off by unknown status except listed case |
| Abnormal | "POWEROFF_ABNORMAL1" | Power off by abnormal status except CPU trouble |
| | "POWEROFF_CPUABNORMAL" | Power off by CPU Abnormal |



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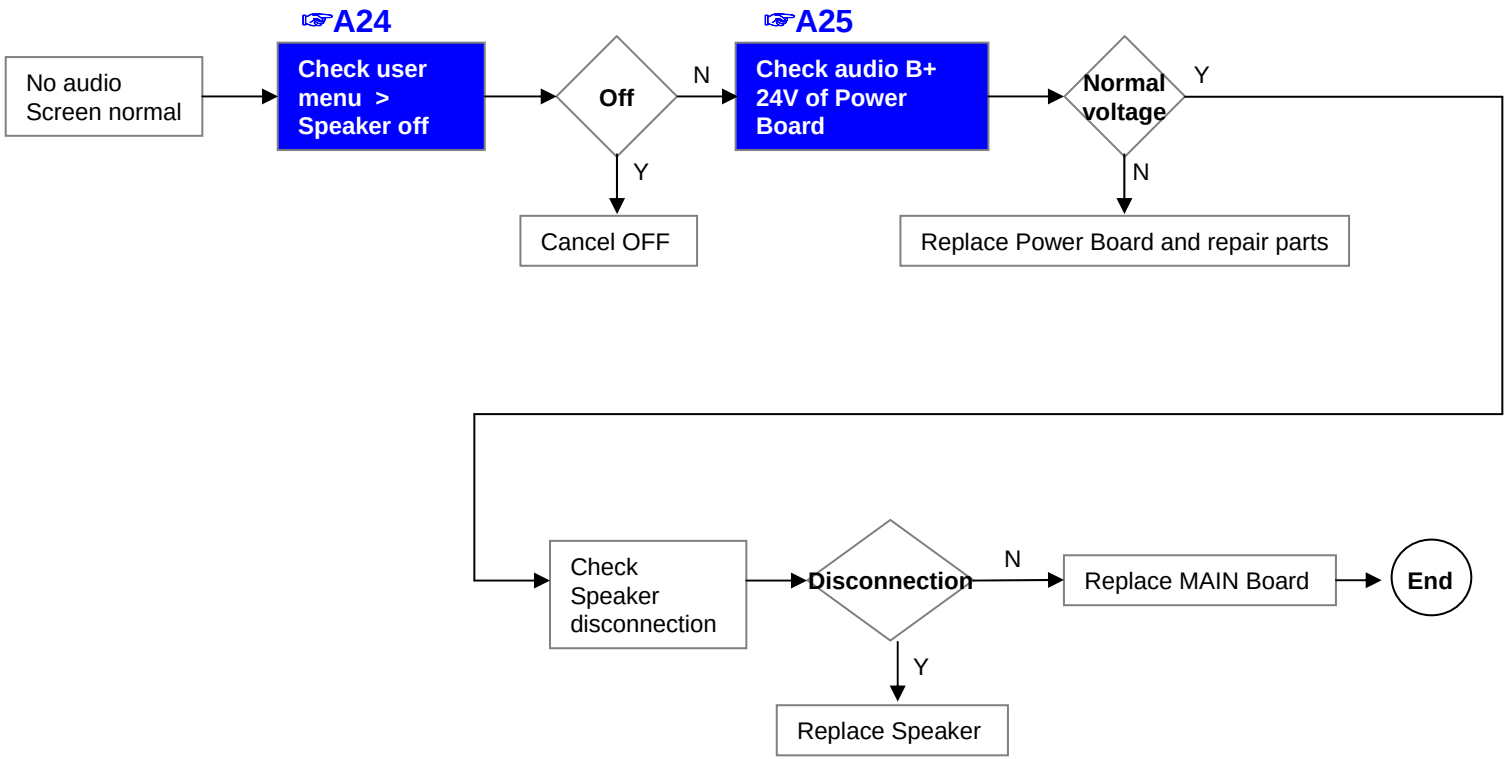
| LCD TV | Error symptom | C. Audio error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | No audio/ Normal video | Revised date | | 8/15 |



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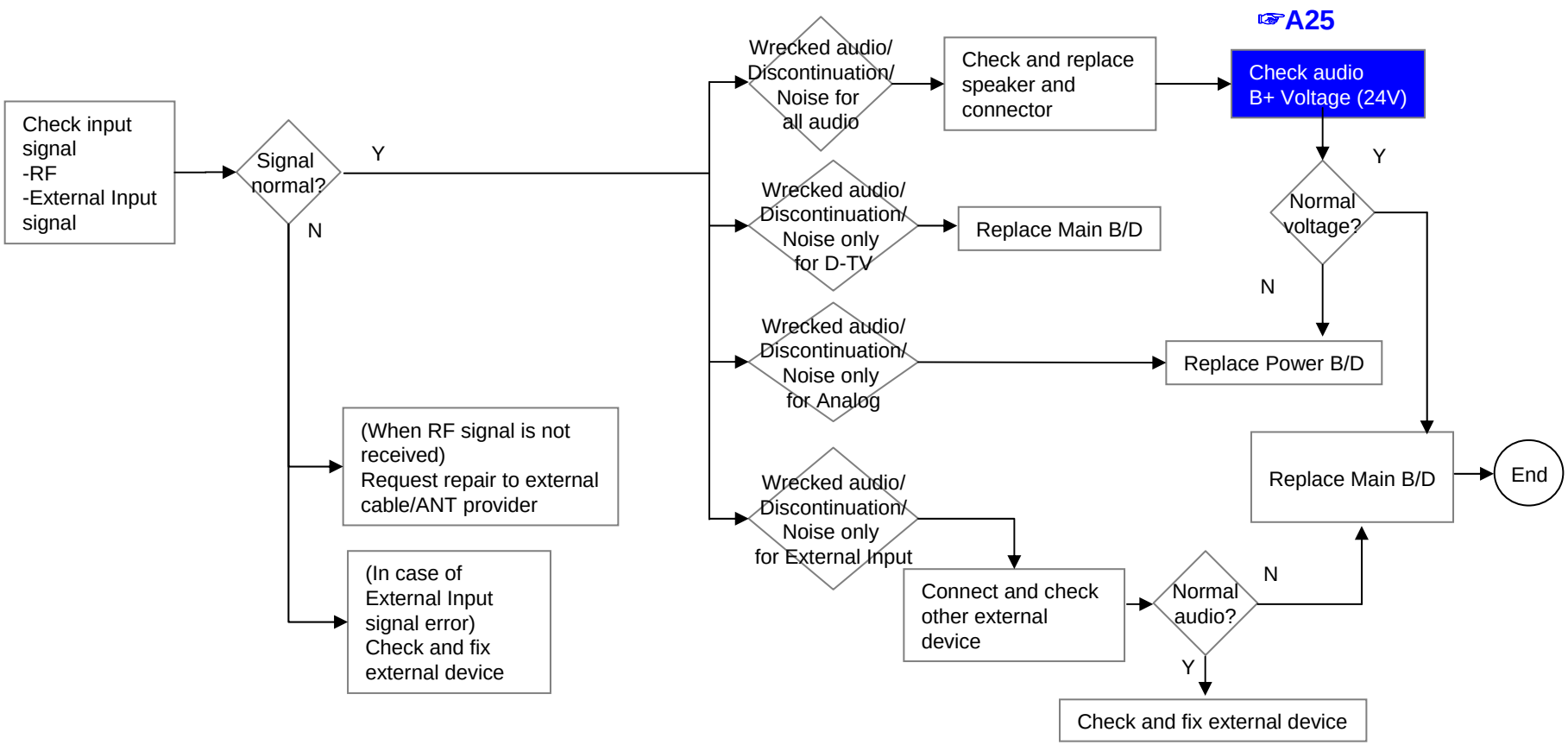
| LCD TV | Error symptom | C. Audio error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Wrecked audio/ discontinuation/noise | Revised date | | 9/15 |

**→ abnormal audio/discontinuation/noise is same after "Check input signal" compared to No audio**


Check input signal -RF -External Input signal
Signal normal?
Y
N
(When RF signal is not received) Request repair to external cable/ANT provider
(In case of External Input signal error) Check and fix external device
Wrecked audio/ Discontinuation/ Noise for all audio
Check and replace speaker and connector
☞A25
Check audio B+ Voltage (24V)
Y
Normal voltage?
N
Wrecked audio/ Discontinuation/ Noise only for D-TV
Replace Main B/D
Wrecked audio/ Discontinuation/ Noise only for Analog
Replace Power B/D
Wrecked audio/ Discontinuation/ Noise only for External Input
Connect and check other external device
Normal audio?
N
Y
Check and fix external device
Replace Main B/D
End



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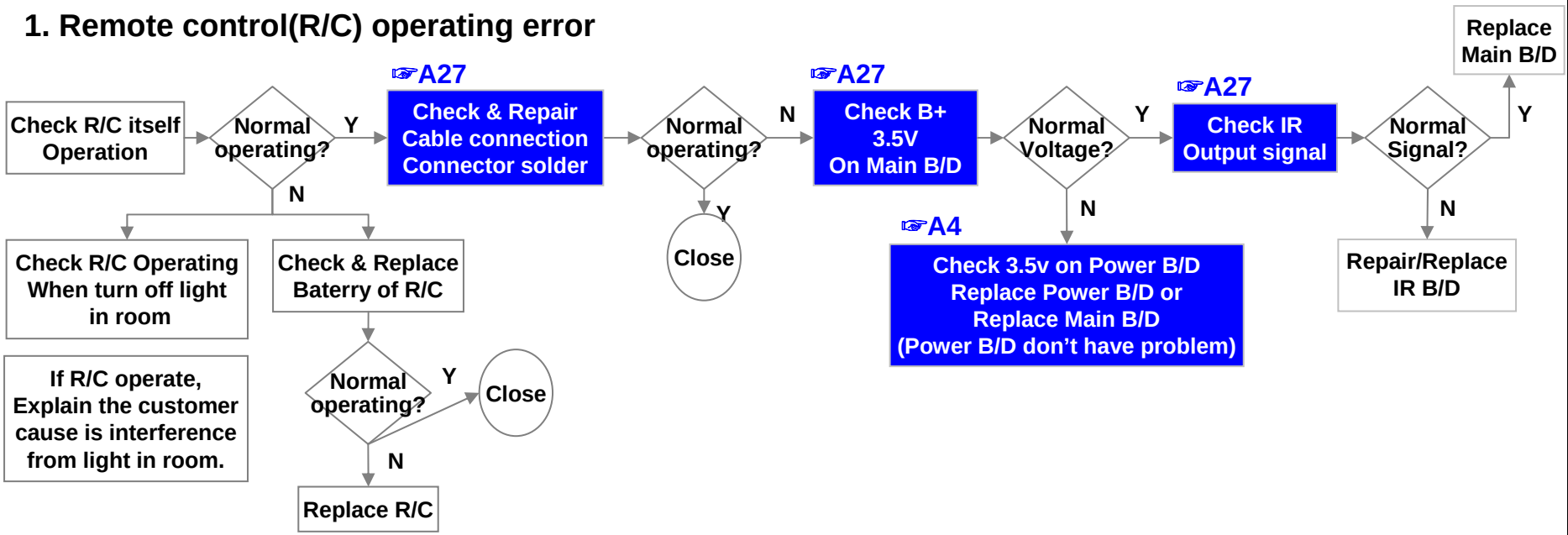
| LCD TV | Error symptom | D. Function error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Remote control & Local switch checking | Revised date | | 10/15 |

## 1. Remote control(R/C) operating error



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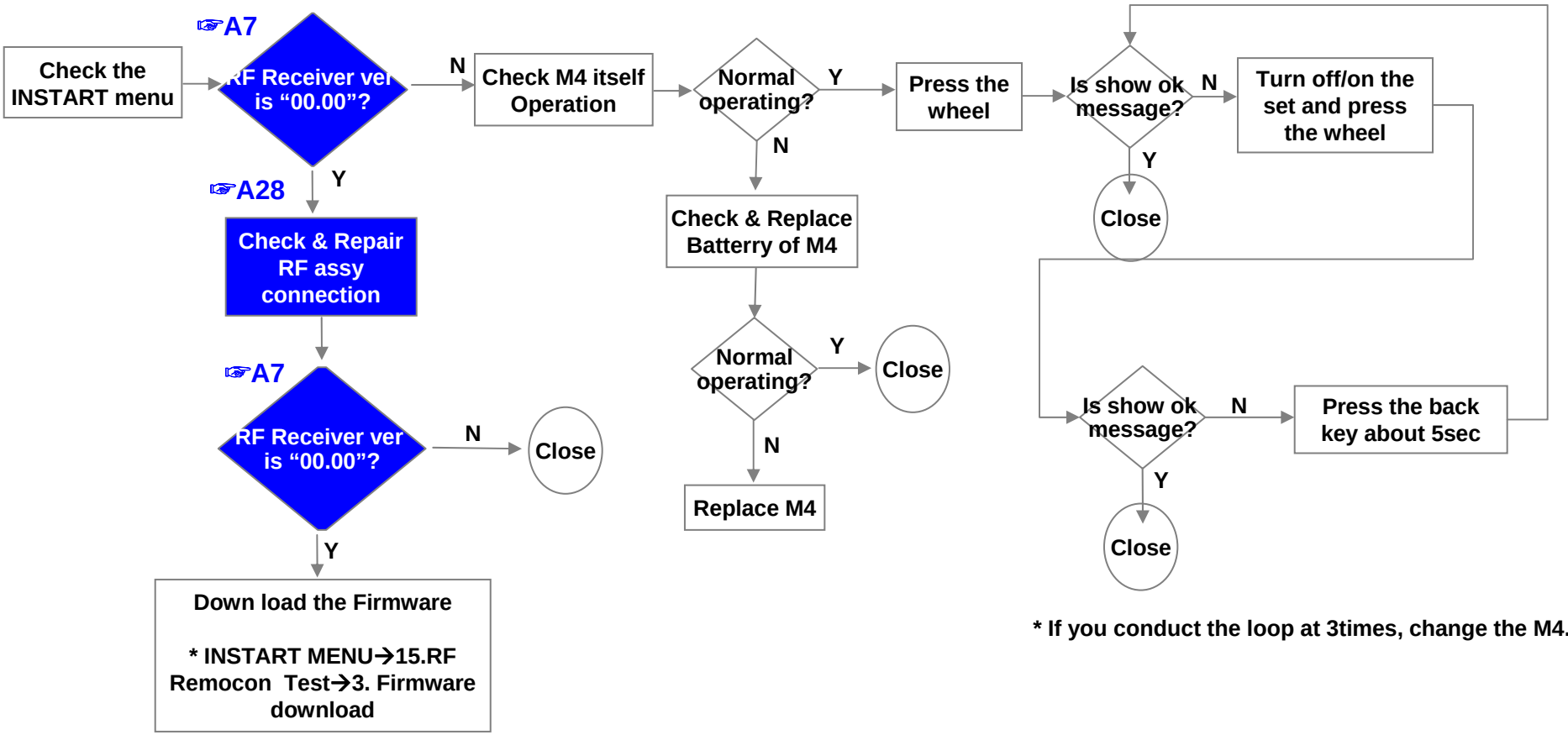
## 2. M4(Magic Remocon) operating error




*** If you conduct the loop at 3times, change the M4.**



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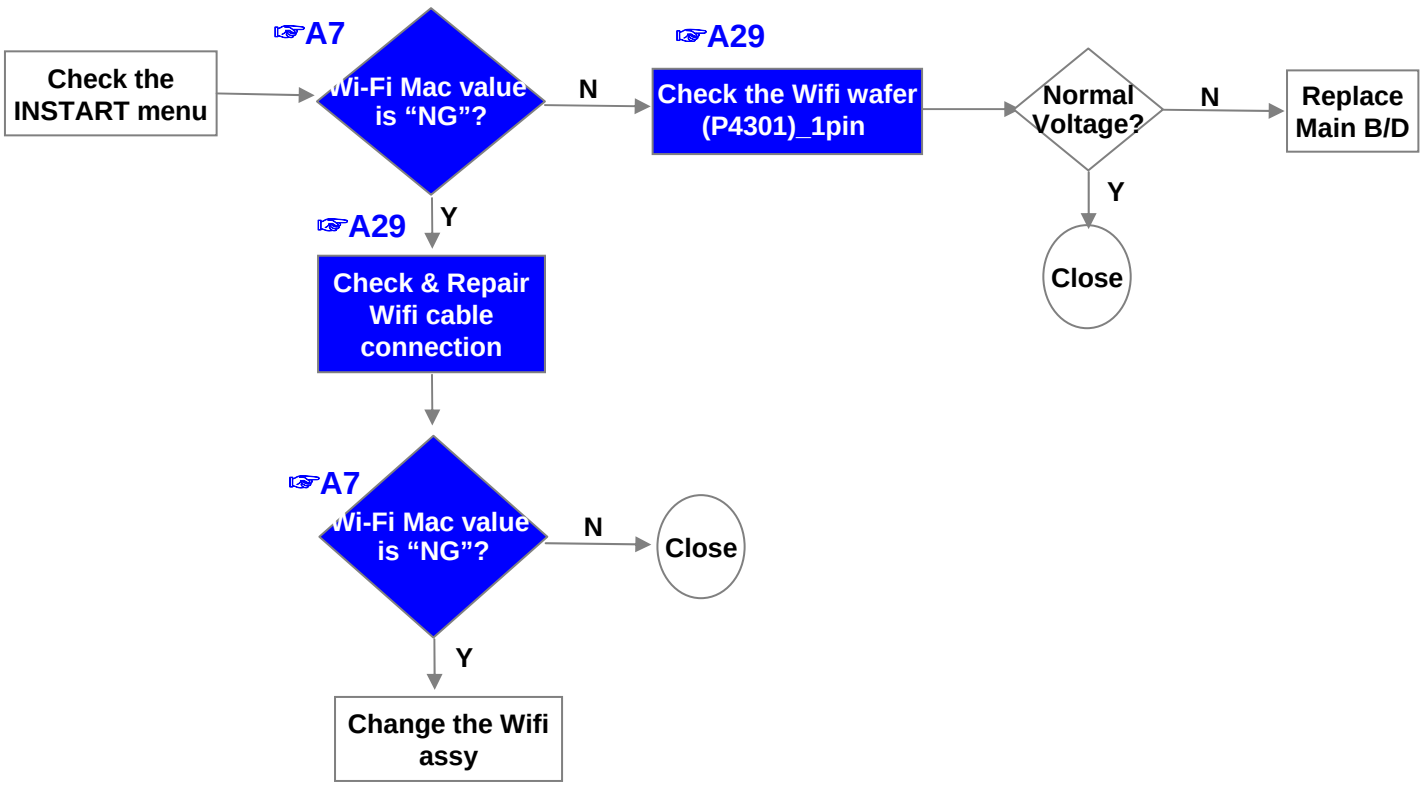
| LCD TV | Error symptom | D. Function error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Wifi operating checking | Revised date | | 12/15 |

## 3.Wifi operating error



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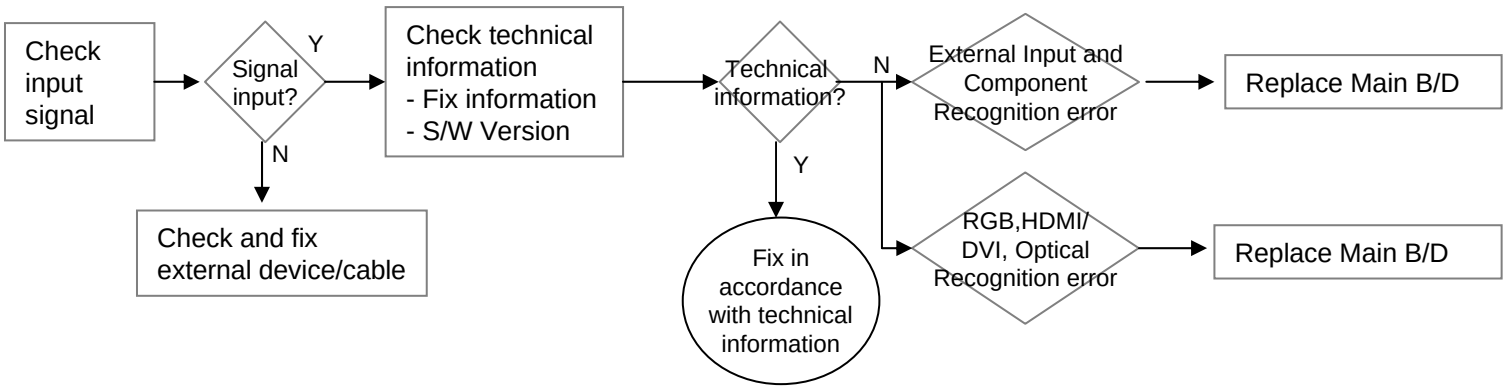
| LCD TV | Error symptom | D. Function error | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | External device recognition error | Revised date | | 13/15 |



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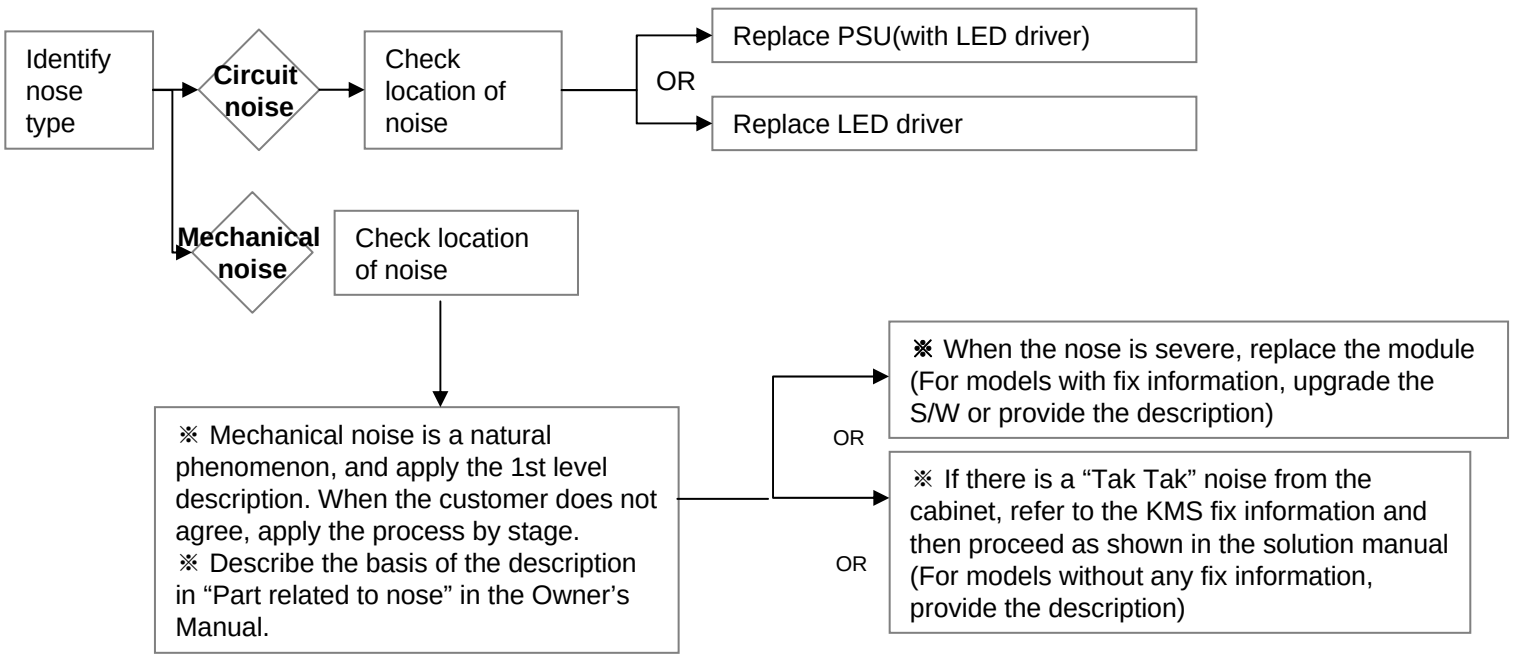
| LCD TV | Error symptom | E. Noise | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Circuit noise, mechanical noise | Revised date | | 14/15 |


Identify nose type
Circuit noise
Check location of noise
Replace PSU(with LED driver)
OR
Replace LED driver
Mechanical noise
Check location of noise
※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in “Part related to nose” in the Owner’s Manual.
OR
※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)
OR
※ If there is a “Tak Tak” noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)



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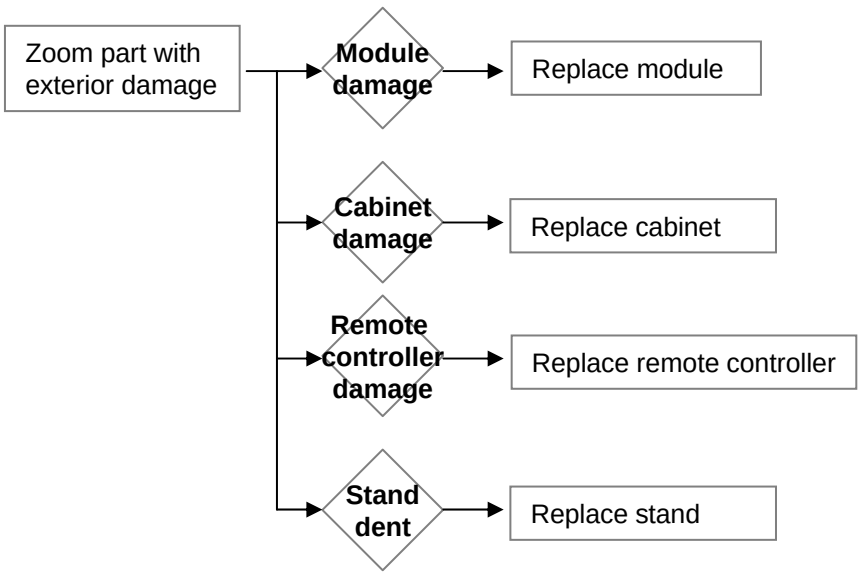
| LCD TV | Error symptom | F. Exterior defect | Established date | 2012.01.16 | |
|---|---|---|---|---|---|
| | | Exterior defect | Revised date | | 15/15 |



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# Contents of LCD TV Standard Repair Process Detail Technical Manual


| No. | Error symptom | Content | Page | Remarks |
|---|---|---|---|---|
| 1 | A. Video error_ No video/Normal audio | Check LCD back light with naked eye | A1 | |
| 2 | | LED driver B+ 24V measuring method | A2 | |
| 3 | | Check White Balance value | A3 | |
| 4 | A. Video error_ No video/Audio | Power Board voltage measuring method | A4 | |
| 5 | A. Video error_ video error /Video lag/stop | TUNER input signal strength checking method | A6 | |
| 6 | | LCD-TV Version checking method | A7 | |
| 7 | | Tuner Checking Part | A8 | |
| 8 | A. Video error _Vertical/Horizontal bar, residual image, light spot | LCD TV connection diagram | A9 | |
| 9 | A. Video error_ Color error | Check Link Cable (LVDS) reconnection condition | A10 | |
| 10 | | Adjustment Test pattern - ADJ Key | A12 | |
| 11 | <Appendix> Defected Type caused by T-Con/ Inverter/ Module | Exchange T-Con Board (1) | A-1/5 | |
| 12 | | Exchange T-Con Board (2) | A-2/5 | |
| 13 | | Exchange LED driver Board (PSU) | A-3/5 | |
| 14 | | Exchange Module (1) | A-4/5 | |
| 15 | | Exchange Module (2) | A-5/5 | |


**Continue to the next page**

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# Contents of LCD TV Standard Repair Process Detail Technical Manual

**Continued from previous page**


| No. | Error symptom | Content | Page | Remarks |
|---|---|---|---|---|
| 16 | B. Power error_ No power | Check front display LED | A17 | |
| 17 | | Check power input Voltage & ST-BY 3.5V | A18 | |
| 18 | | Checking method when power is ON | A19 | |
| 19 | B. Power error_Off when on, off while viewing | POWER OFF MODE checking method | A22 | |
| 20 | C. Audio error_ No audio/Normal video | Checking method in menu when there is no audio | A24 | |
| 22 | | Voltage and speaker checking method when there is no audio | A25 | |
| 22 | D. Function error | Remote controller operation checking method | A27 | |
| 23 | | Motion Remote operation checking method | A28 | |
| 24 | | Wifi operation checking method | A29 | |


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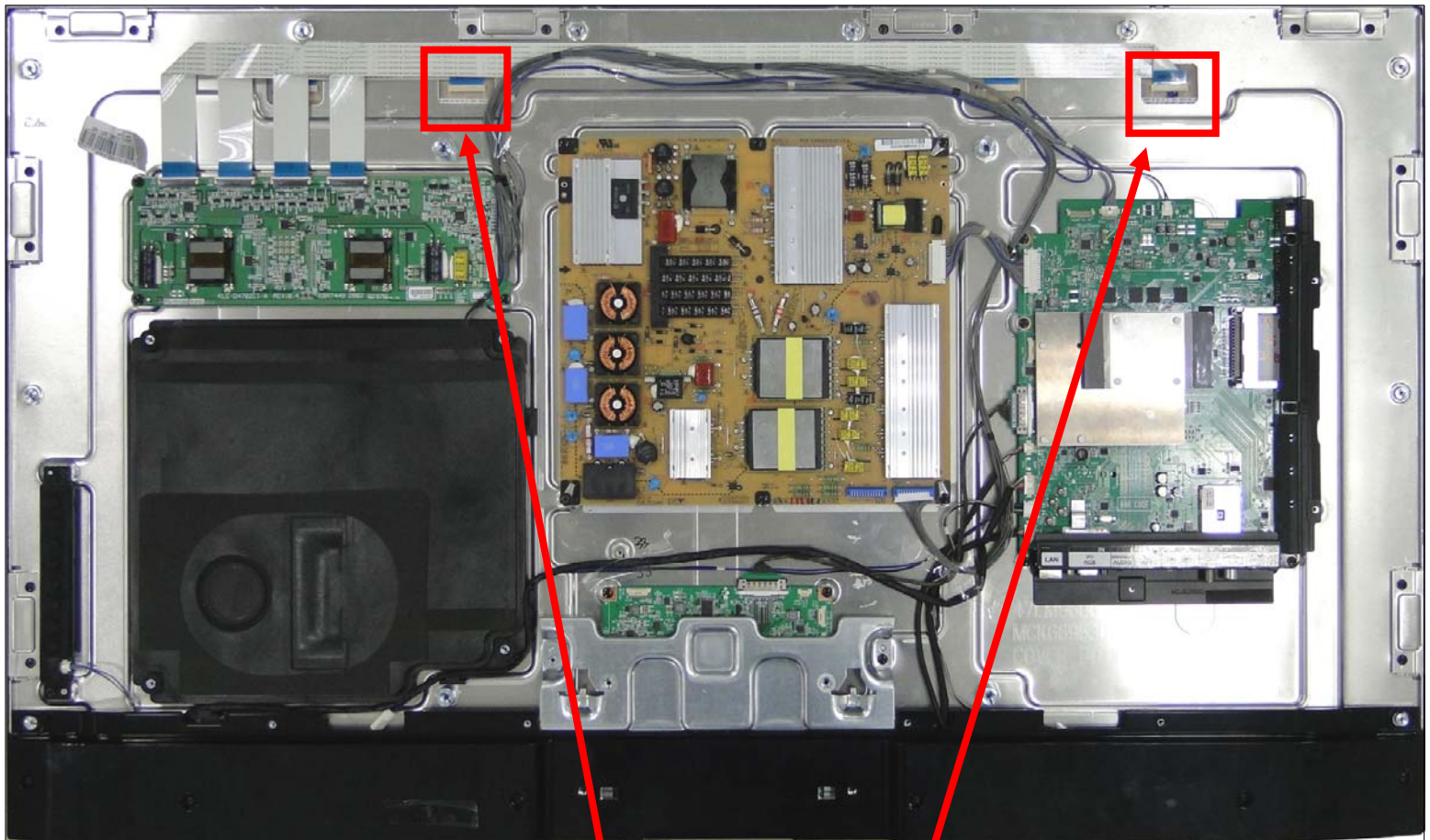
# Standard Repair Process Detail Technical Manual

| LCD TV | Error symptom | A. Video error_No video/Normal audio | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Check LCD back light with naked eye | Revised date | | A1 |

<XXLM9600>



After turning on the power and disassembling the case, check with the naked eye, whether you can see light from 2 locations.

**A1**

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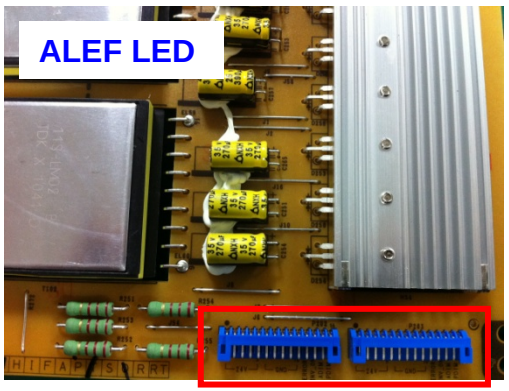
| LCD TV | Error symptom | A. Video error_No video/Normal audio | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | LED driver B+ 24V measuring method | Revised date | | A2 |




Check the DC 24V and Inverter on

| 14 Pin (Power Board ↔ Driver) PSU | |
|---|---|
| 1 ~ 5 | 24V |
| 6 ~ 10 | GND |
| 11 | Detect |
| 12 | Inverter On/Off |
| 13 | Int. PWM |
| 14 | Ext. PWM (PDIM) |



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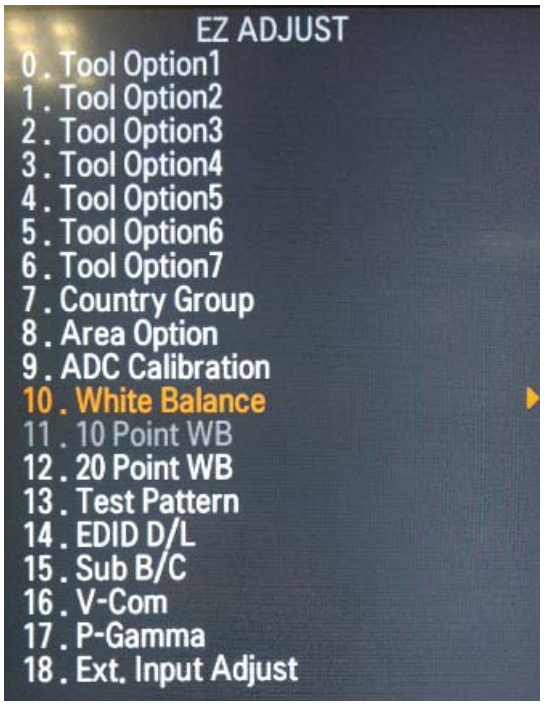
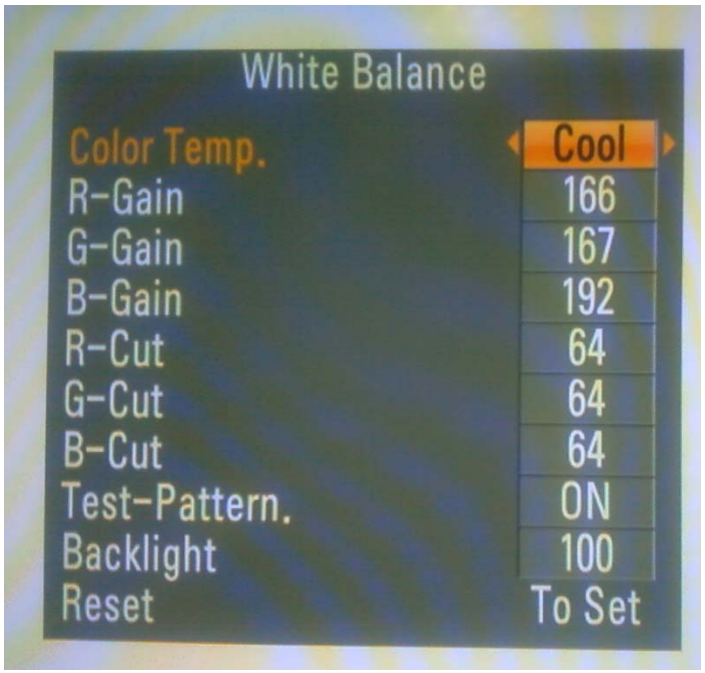
# Standard Repair Process Detail Technical Manual

| LCD TV | Error symptom | A. Video error_No video/Normal audio | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Check White Balance value | Revised date | | A3 |

<ALL MODELS>


EZ ADJUST
0 . Tool Option1
1 . Tool Option2
2 . Tool Option3
3 . Tool Option4
4 . Tool Option5
5 . Tool Option6
6 . Tool Option7
7 . Country Group
8 . Area Option
9 . ADC Calibration
10 . White Balance
11 . 10 Point WB
12 . 20 Point WB
13 . Test Pattern
14 . EDID D/L
15 . Sub B/C
16 . V-Com
17 . P-Gamma
18 . Ext. Input Adjust




**Entry method**

1. Press the ADJ button on the remote controller for adjustment.

2. Enter into White Balance of item 10.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.



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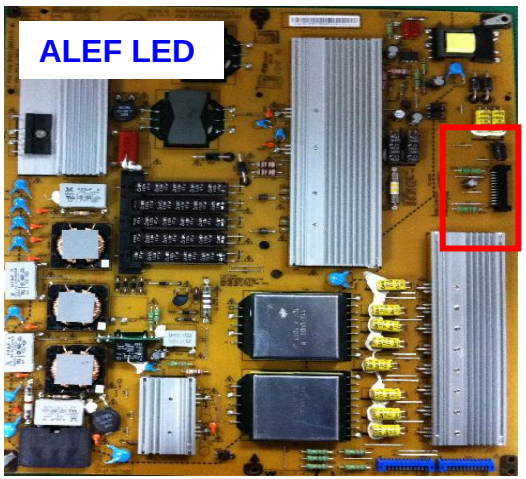


Check the DC 24V, 12V, 3.5V.

| 24 Pin (Power Board ↔ Main Board) – 공통 | | | |
|---|---|---|---|
| SMAW200-H24S (YEONHO) | | | |
| 1 | Power on | 2 | 20V (24V) |
| 3 | 20V (24V) | 4 | 20V (24V) |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | 3.5V | 10 | 3.5V |
| 11 | 3.5V | 12 | 3.5V |
| 13 | GND | 14 | GND |
| 15 | GND | 16 | N.C<br>(Only LPB : V-sync) |
| 17 | 12V | 18 | Inverter On/off |
| 19 | 12V | 20 | N.C<br>(LPB, Lamp : A-dim) |
| 21 | 12V | 22 | PWM Dim #1 |
| 23 | N.C<br>(only Lamp SCANNING Model<br>: PWM Dim #2) | 24 | Error-out |



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<ALL MODELS>

Settings → Set up → Manual Tuning → select channel

When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)

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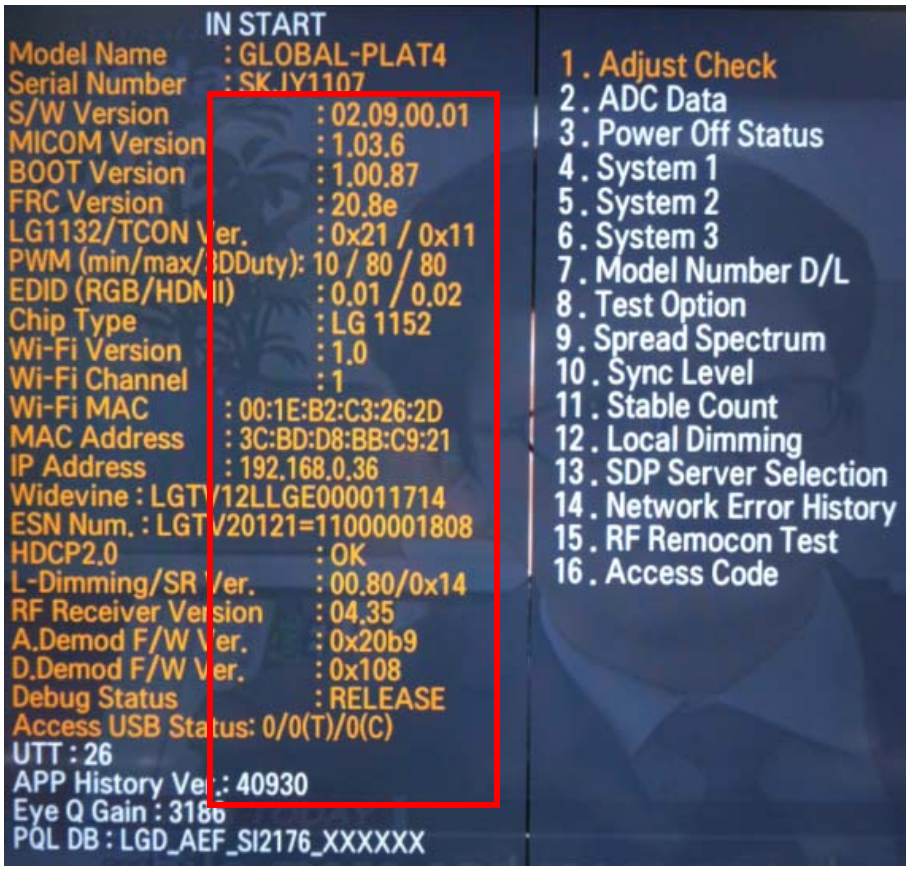
<ALL MODELS>

## 1. Checking method for remote controller for adjustment

**Version**


IN START
Model Name : GLOBAL-PLAT4
Serial Number : SKJY1107
S/W Version : 02.09.00.01
MICOM Version : 1.03.6
BOOT Version : 1.00.87
FRC Version : 20.8e
LG1132/TCON Ver. : 0x21 / 0x11
PWM (min/max/3DDuty): 10 / 80 / 80
EDID (RGB/HDMI) : 0.01 / 0.02
Chip Type : LG 1152
Wi-Fi Version : 1.0
Wi-Fi Channel : 1
Wi-Fi MAC : 00:1E:B2:C3:26:2D
MAC Address : 3C:BD:D8:BB:C9:21
IP Address : 192.168.0.36
Widevine : LGTV12LLGE000011714
ESN Num. : LGTV20121=11000001808
HDCP2.0 : OK
L-Dimming/SR Ver. : 00.80/0x14
RF Receiver Version : 04.35
A.Demod F/W Ver. : 0x20b9
D.Demod F/W Ver. : 0x108
Debug Status : RELEASE
Access USB Status: 0/0(T)/0(C)
UTT : 26
APP History Ver. : 40930
Eye Q Gain : 3186
PQL DB : LGD_AEF_SI2176_XXXXXX
1 . Adjust Check
2 . ADC Data
3 . Power Off Status
4 . System 1
5 . System 2
6 . System 3
7 . Model Number D/L
8 . Test Option
9 . Spread Spectrum
10 . Sync Level
11 . Stable Count
12 . Local Dimming
13 . SDP Server Selection
14 . Network Error History
15 . RF Remocon Test
16 . Access Code

Press the IN-START with the remote controller for adjustment



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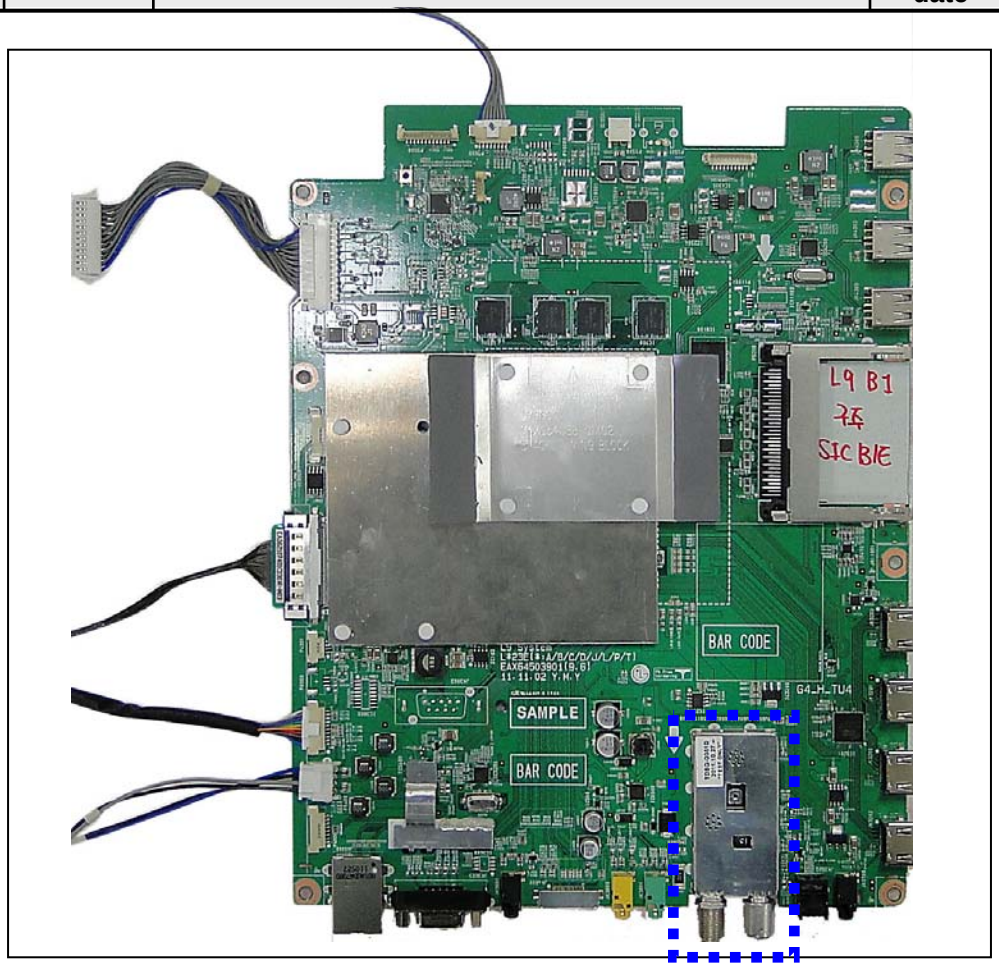
| LCD TV | Error symptom | A. Video error_Video error, video lag/stop | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | TUNER checking part | Revised date | | A8 |

<ALL MODELS>




Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.



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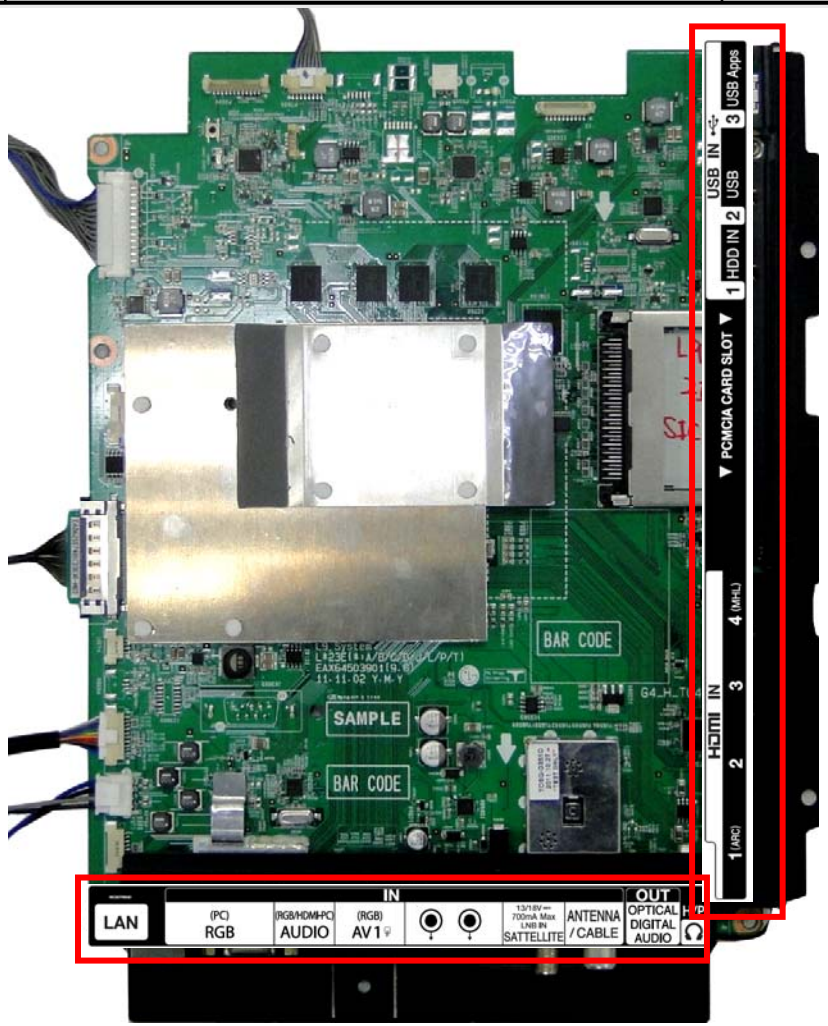
# Standard Repair Process Detail Technical Manual

| LCD TV | Error symptom | A. Video error _Vertical/Horizontal bar, residual image, light spot | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | LCD TV connection diagram (1) | Revised date | | A9 |

<ALL MODELS>




**As the part connecting to the external input, check the screen condition by signal**

**A9**

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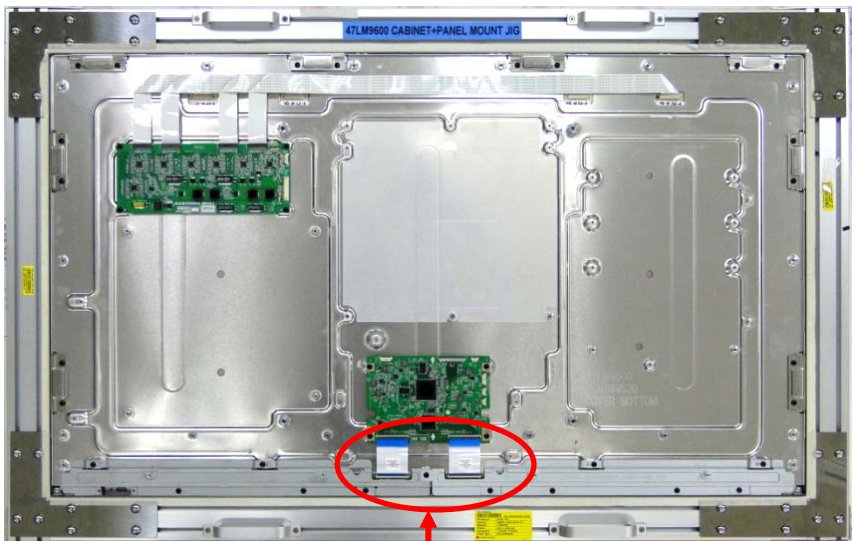
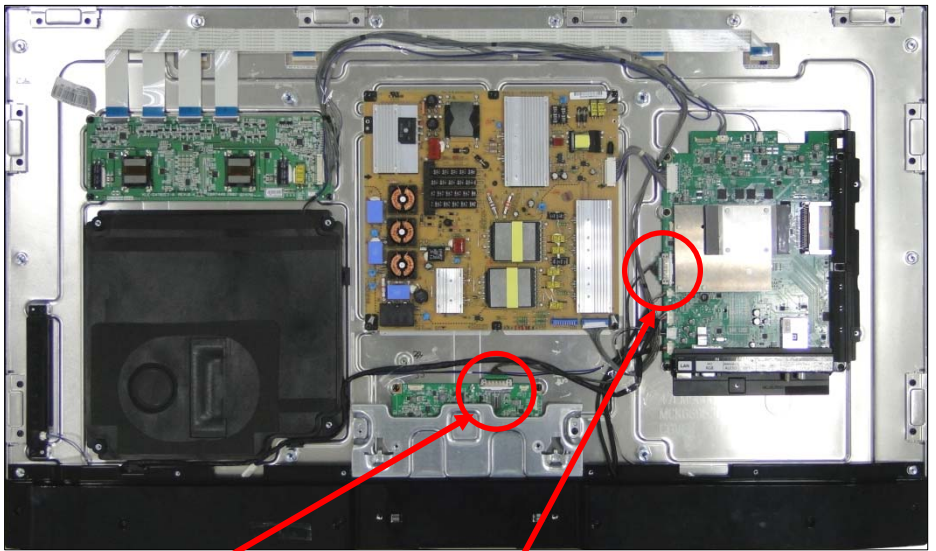
| LCD TV | Error symptom | A. Video error_Color error | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Check Link Cable (LVDS) reconnection condition | Revised date | | A10 |

<ALL MODELS>



Check the contact condition of the Link Cable, especially dust or mis insertion.



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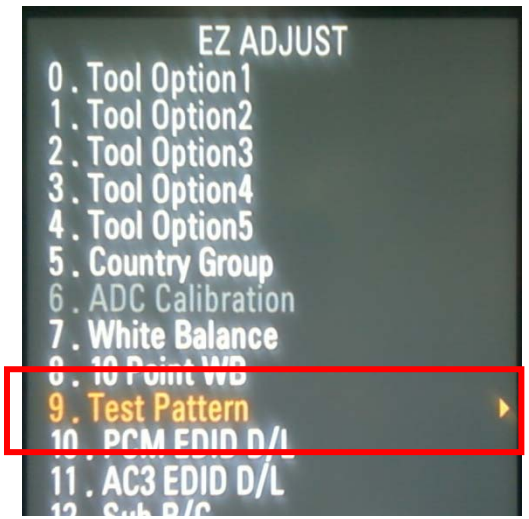
# Standard Repair Process Detail Technical Manual

| LCD TV | Error symptom | A. Video error_Color error | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Adjustment Test pattern - ADJ Key | Revised date | | A12 |



You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)



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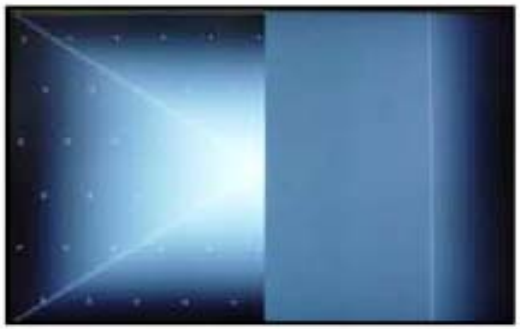
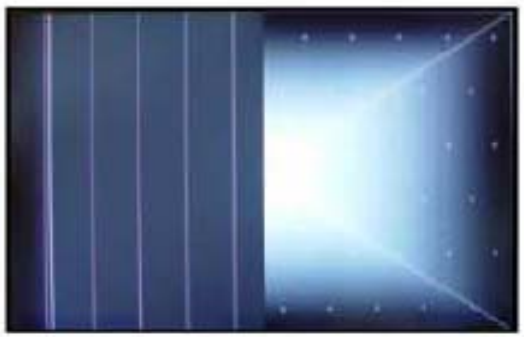
# Appendix : Exchange T-Con Board (1)

Solder defect, CNT Broken

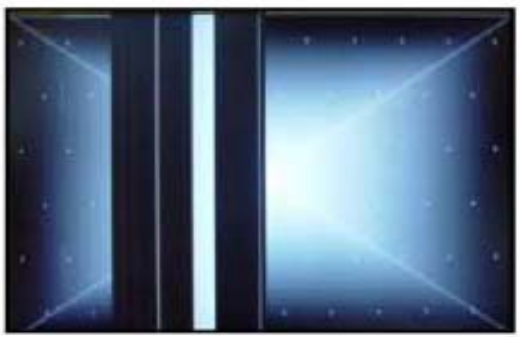


Solder defect, CNT Broken



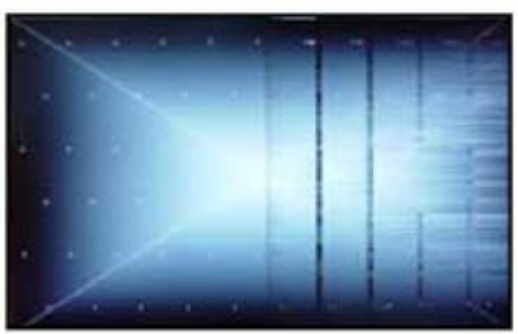
Solder defect, CNT Broken

Solder defect, CNT Broken



Solder defect, CNT Broken

Abnormal Power Section



Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack



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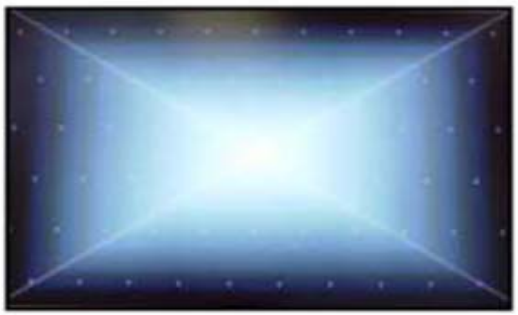
# Appendix : Exchange T-Con Board (2)



Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

GRADATION



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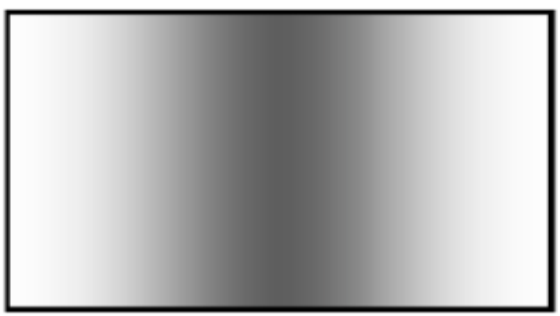
# Appendix : Exchange LED driver Board (PSU)

No Light

Dim Light

Dim Light



Dim Light

No picture/Sound Ok



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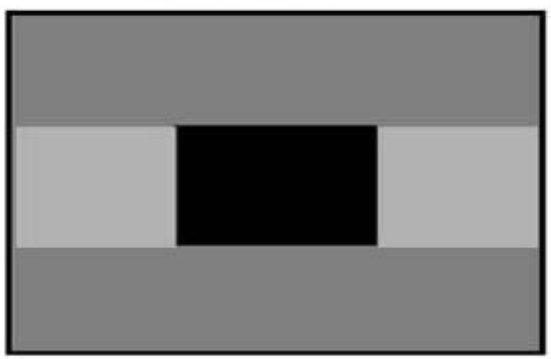
# Appendix : Exchange the Module (1)

Panel Mura, Light leakage

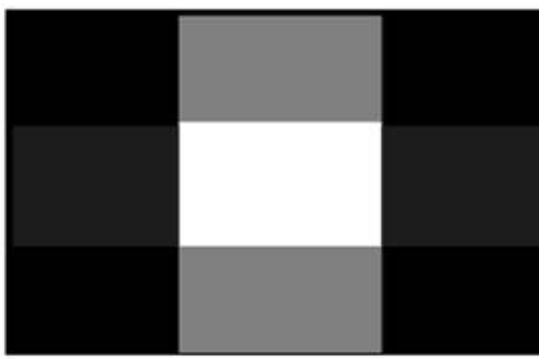
Panel Mura, Light leakage

Press damage



Crosstalk

Press damage



Crosstalk

Press damage

**Un-repairable Cases**

**In this case please exchange the module.**



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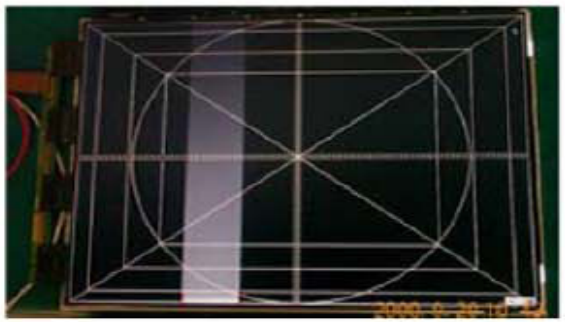
# Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect

Vertical Line
Source TAB IC Defect

Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal line
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect

**Un-repairable Cases**

**In this case please exchange the module.**



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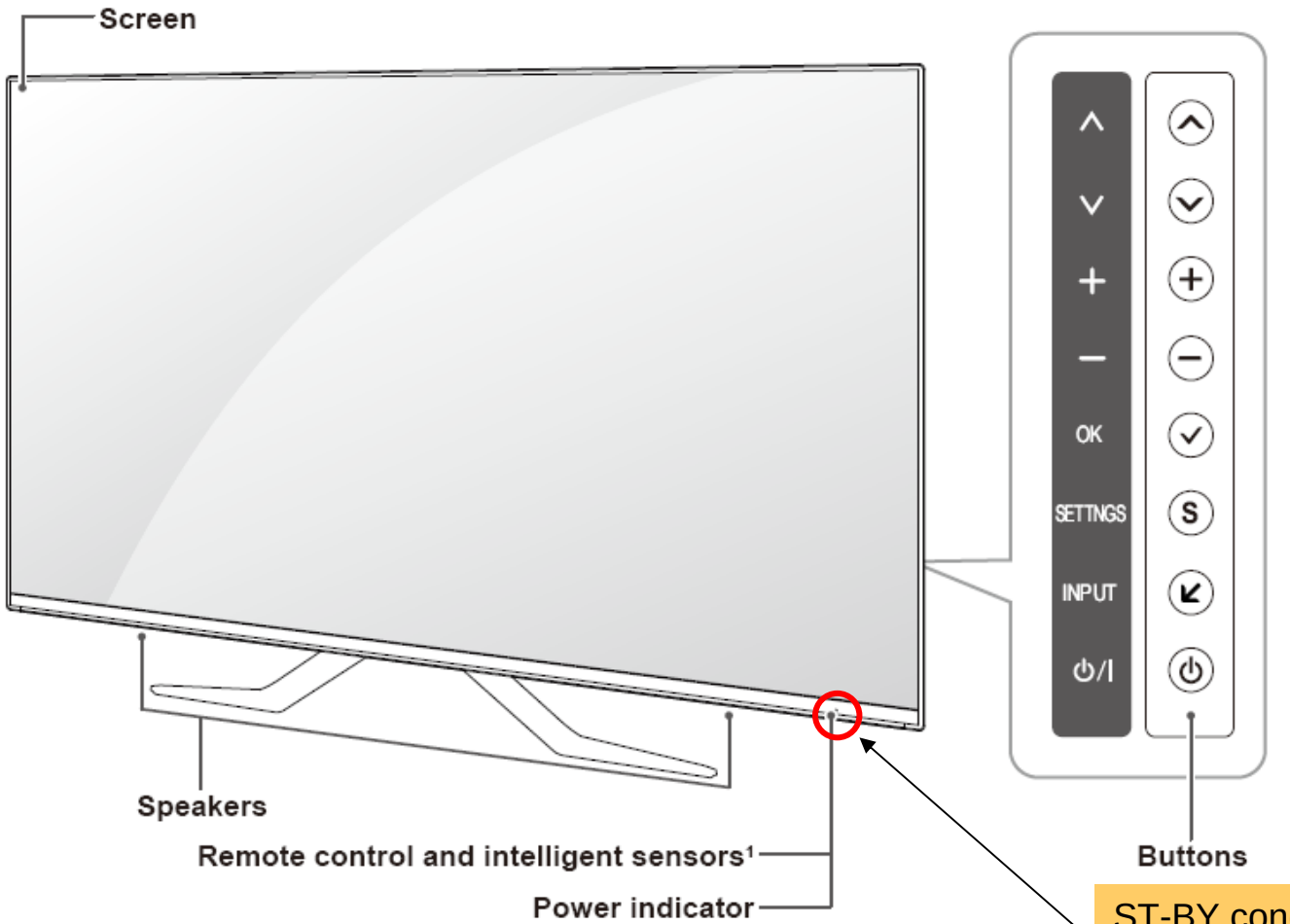


Front LED control :
Menu → Option →
Standby Light
→ ON/ Off

ST-BY condition: Red or Turn Off
Power ON condition: Turn Off



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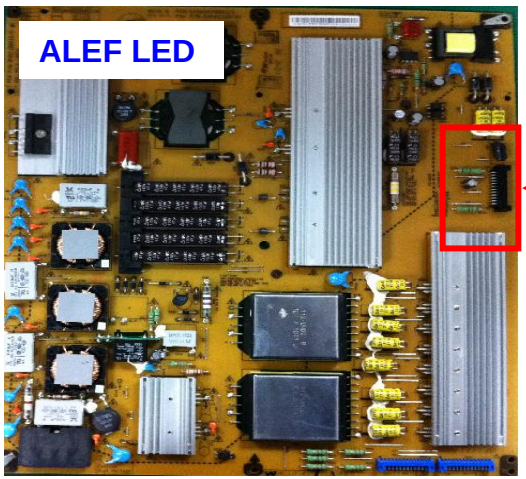
| LCD TV | Error symptom | B. Power error _No power | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Check power input voltage and ST-BY 3.5V | Revised date | | A18 |

<XXLM9600>




Check the DC 24V, 12V, 3.5V.

| 24 Pin (Power Board ↔ Main Board) – 공통 | | | |
|---|---|---|---|
| SMAW200-H24S (YEONHO) | | | |
| 1 | Power on | 2 | 20V (24V) |
| 3 | 20V (24V) | 4 | 20V (24V) |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | 3.5V | 10 | 3.5V |
| 11 | 3.5V | 12 | 3.5V |
| 13 | GND | 14 | GND |
| 15 | GND | 16 | N.C<br>(Only LPB : V-sync) |
| 17 | 12V | 18 | Inverter On/off |
| 19 | 12V | 20 | N.C<br>(LPB, Lamp : A-dim) |
| 21 | 12V | 22 | PWM Dim #1 |
| 23 | N.C<br>(only Lamp SCANNING Model<br>: PWM Dim #2) | 24 | Error-out |



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| LCD TV | Error symptom | B. Power error _No power | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Checking method when power is ON | Revised date | | A19 |

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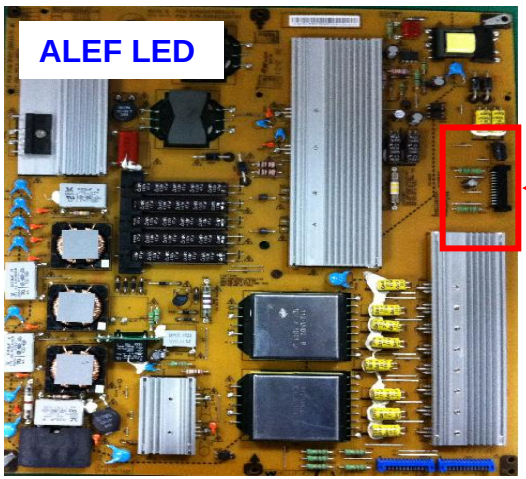


Check “power on” pin is high

| 24 Pin (Power Board ↔ Main Board) – 공통 | | | |
|---|---|---|---|
| SMAW200-H24S (YEONHO) | | | |
| 1 | Power on | 2 | 20V (24V) |
| 3 | 20V (24V) | 4 | 20V (24V) |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | 3.5V | 10 | 3.5V |
| 11 | 3.5V | 12 | 3.5V |
| 13 | GND | 14 | GND |
| 15 | GND | 16 | N.C<br>(Only LPB : V-sync) |
| 17 | 12V | 18 | Inverter On/off |
| 19 | 12V | 20 | N.C<br>(LPB, Lamp : A-dim) |
| 21 | 12V | 22 | PWM Dim #1 |
| 23 | N.C<br>(only Lamp SCANNING Model<br>: PWM Dim #2) | 24 | Error-out |



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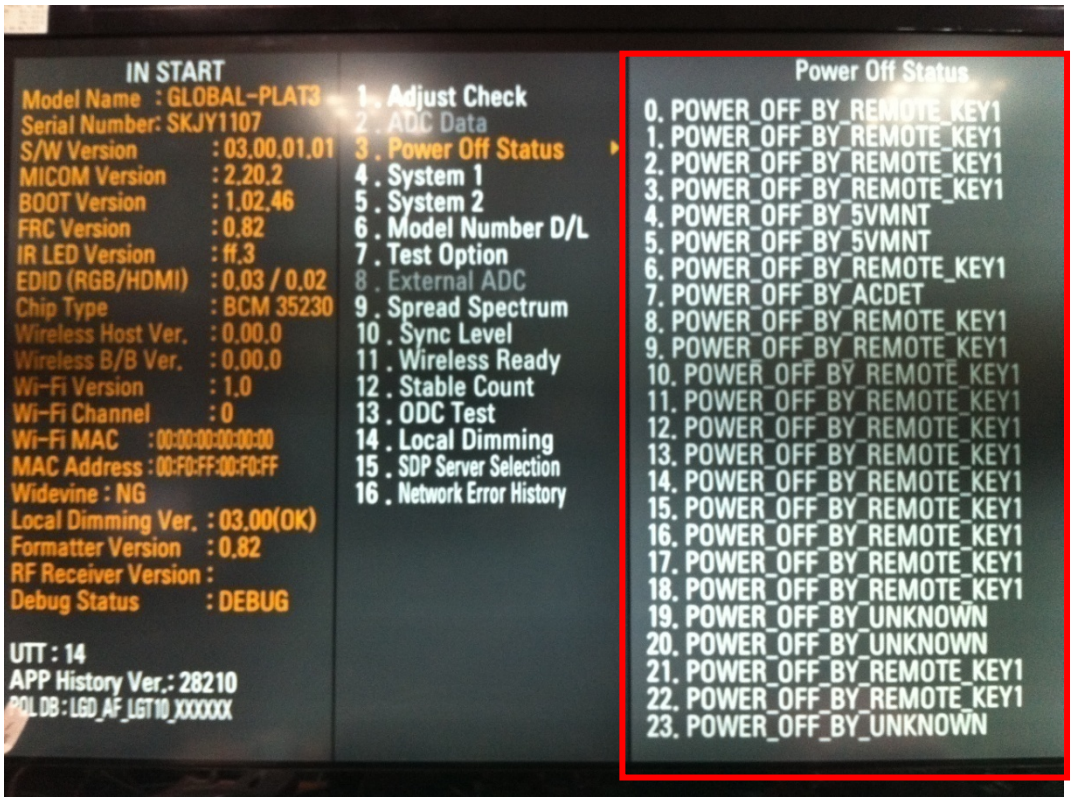
# Standard Repair Process Detail Technical Manual

| LCD TV | Error symptom | B. Power error _Off when on, off whiling viewing | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | POWER OFF MODE checking method | Revised date | | A22 |

<ALL MODELS>




Entry method

1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3



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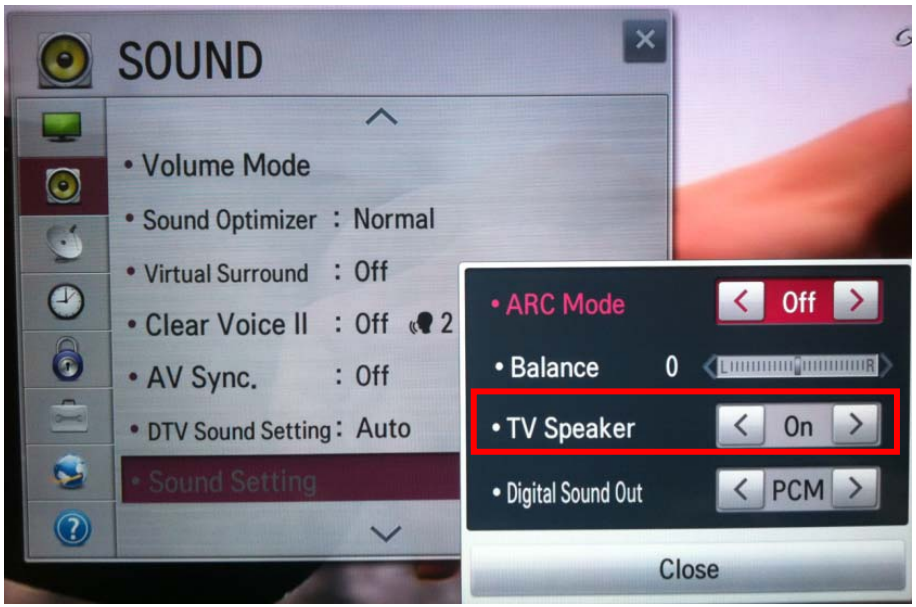
| LCD TV | Error symptom | C. Audio error_No audio/Normal video | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Checking method in menu when there is no audio | Revised date | | A24 |

<ALL MODELS>




## Checking method

1. Press the Setting button on the remote controller
2. Select the Sound function of the Menu
3. Select the Sound Setting
4. Select TV Speaker from Off to On



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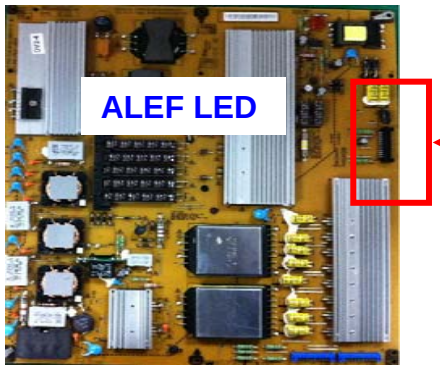
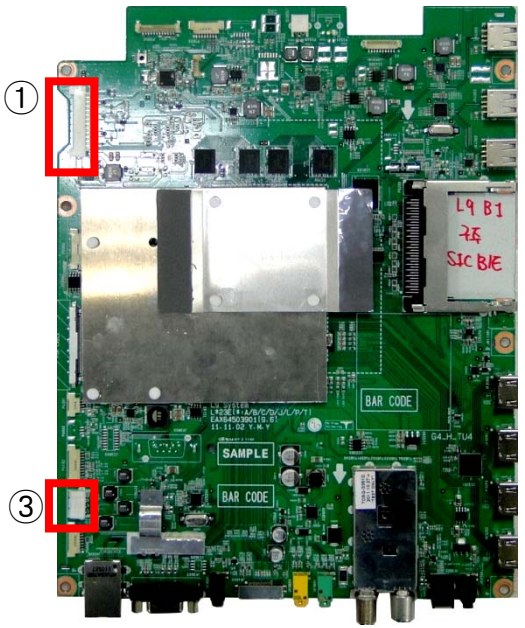



②

| 24 Pin (Power Board ↔ Main Board) | | | |
|---|---|---|---|
| 1 | Power on | 2 | 24V |
| 3 | 24V | 4 | 24V |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | 3.5V | 10 | 3.5V |
| 11 | 3.5V | 12 | 3.5V |
| 13 | GND | 14 | GND |
| 15 | GND | 16 | V-sync |
| 17 | 12V | 18 | Inverter On/off |
| 19 | 12V | 20 | N.C |
| 21 | 12V | 22 | PWM Dim #1 |
| 23 | PWM Dim #2 | 24 | Error-out |




**Checking order when there is no audio**

① Check the contact condition of or 24V connector of Main Board

② Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)

③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.



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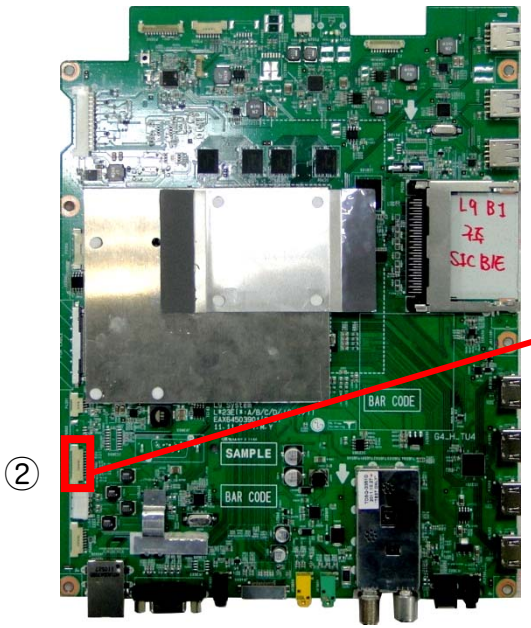


| P4102 | |
|---|---|
| 1 | SCL |
| 2 | SDA |
| 3 | GND |
| 4 | KEY1 |
| 5 | KEY2 |
| ③ 6 | St 3.5V |
| 7 | GND |
| 8 | GP4_LED_R |
| ④ 9 | IR |
| 10 | GND |

Checking order

1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.3V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.



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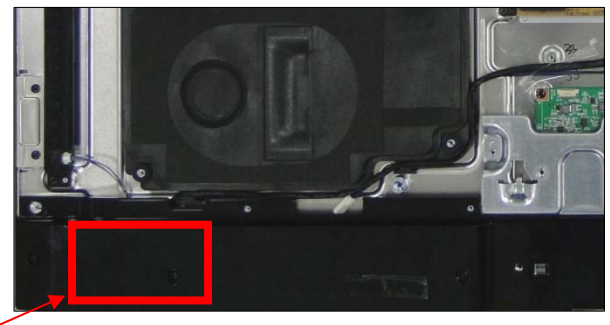

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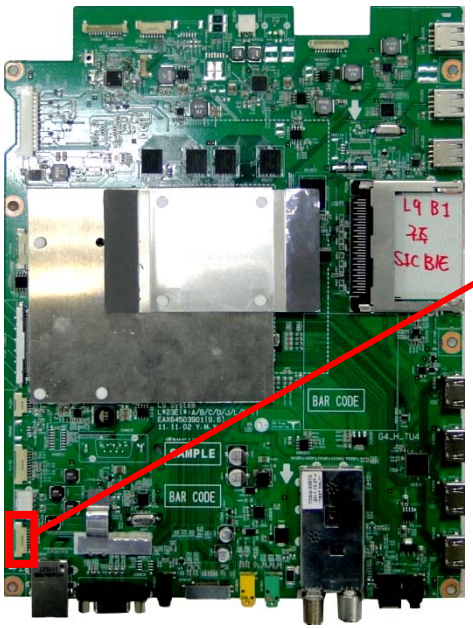


②

③

| P4800 | |
|---|---|
| 1 | 3.3V |
| 2 | GND |
| 3 | RX |
| 4 | TX |
| 5 | RESET |
| 6 | DC |
| 7 | DD |
| 8 | GND |

Checking order

1, 2. Check Motion cable condition between Motion assy & Main board.
3. Check the 3.3V on the terminal 1.



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| LCD TV | Error symptom | D. Function error | Established date | 2011. 12 .14 | |
|---|---|---|---|---|---|
| | Content | Wifi operation checking method | Revised date | | A29 |

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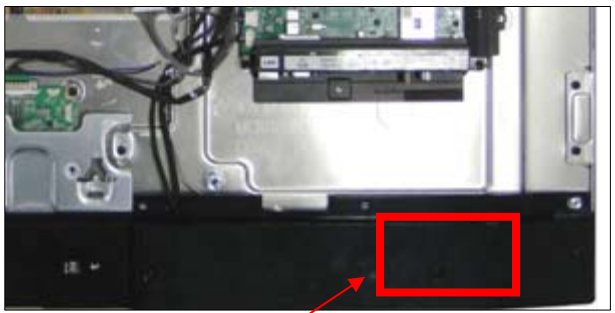

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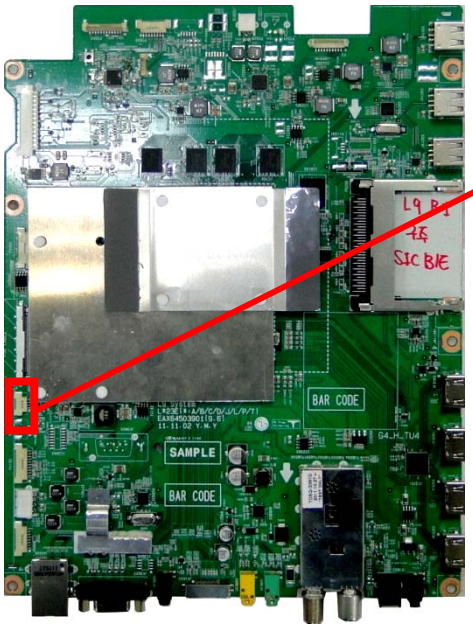


②

③

| P4301 | |
|---|---|
| 1 | VDD |
| 2 | DM |
| 3 | DP |
| 4 | GND |

Checking order

1, 2. Check Wifi cable condition between Wifi assy & Main board.
3. Check the 5V on the terminal 1.



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